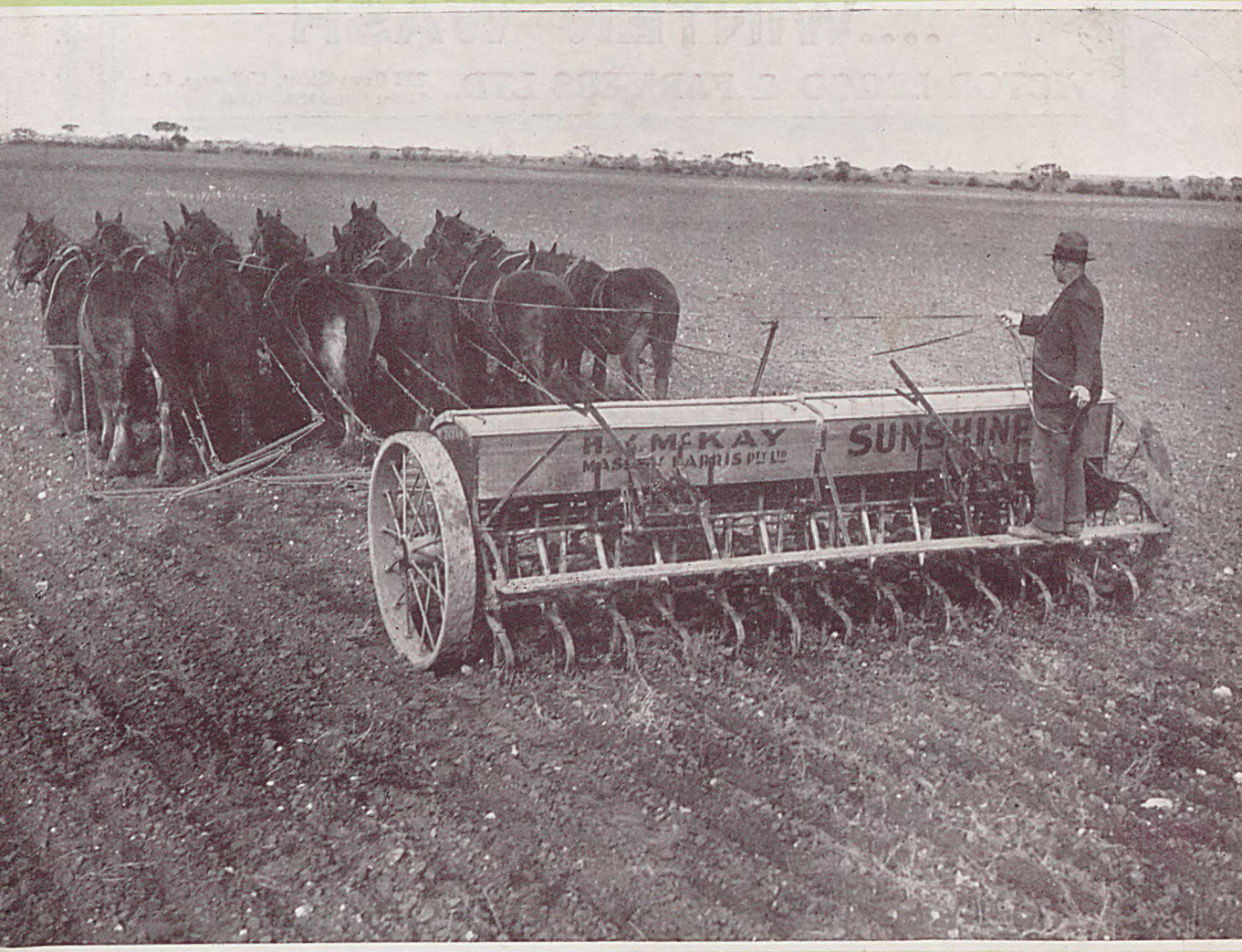
NATIONAL MUSEUM OF VICTORIA

# THE JOURNAL of The Department OF AGRICULTURE

VICTORIA · · · AUSTRALIA

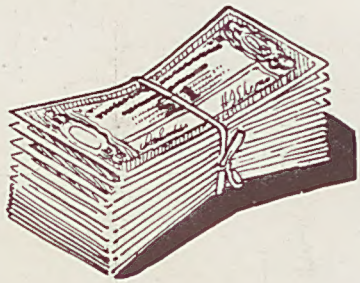
Vol. XXXVI.—Part 7. JULY, 1938. PRICE, 3D.




Registered at the General Post Office, Melbourne, for transmission by Post as a Newspaper

Save in the SPRING

Spray in the WINTER



"VALLO" OVICIDAL WINTER WASH

Applied in Winter—during dormant period of trees—definitely kills all aphid eggs.

100% EFFECTIVE

"Vallo" Ovicidal Wash controls San Jose, Red Spider, and kills pupae in the ground.

With "VALLO" OVICIDAL ....WINTER WASH

VICTOR LEGGO & FARMERS LTD., 222 Queen Street, Melbourne, C.1 Phone: Central 1243. G.P.O. Box 508 H

"VALLO" SHEEP DIPS

"VALLO" POWDER DIP

C/s 10 x 10 lb Pkts.

DUAL-PURPOSE QUICK ACTING DIP

C/s 10 x 9 lb. Pkts.

LIQUID SHEEP DIP

Drums 5 gallons

Supplies Obtainable from

VICTOR LEGGO & FARMERS Ltd.,

Phone C.1243 222 QUEEN STREET, MELBOURNE, C.1 G.P.O. Box 508 H

NATIONAL MUSEUM OF VICTORIA

# Contents.

**JULY, 1938**


| | | PAGE |
|---|---|---|
| Milling and Baking Qualities of Wheat | *W. R. Jewell, M.Sc.* | 313 |
| Tubercle Free Herds | | 319 |
| Root Rot of Onions | *A. T. Pugsley, B.Agr.Sc.* | 320 |
| Pigs in the Orchard—A Profitable Sideline | *A. C. T. Hewitt, M.Agr.Sc.* | 321 |
| Ringworm in Animals | | 326 |
| Clean Milk and Hygienic Dairy Farm Competition | *R. T. McKenzie, R. C. Lorimer, and A. Clark* | 327 |
| World Consumption of Wool, 1937 | | 330 |
| London Markets | | 332 |
| Nut Culture in Victoria—The Walnut—Part II. | *E. E. Pescott, F.L.S.* | 333 |
| Spirochaetosis or Tick Fever of Poultry | *Veterinary Staff* | 339 |
| Hygienic Dairy Produce | | 342 |
| Breeding Poultry for Egg Production | *H. Clinton* | 343 |
| Spring Grafting—Provision of Scions | *F. J. Greatorex* | 345 |
| Packing Chart for Grapefruit—Californian Export Case | *B. P. Krone* | 346 |
| Stock Foods Act—Brands Registered for 1938 | *W. C. Robertson* | 347 |
| Tobacco Seed Beds—Preservation of Covers | *W. J. B. McDonald, B.Agr.Sc.* | 352 |
| Orchard and Garden | *A. W. Jessop, M.Agr.Sc., B.Sc., Dip. Ed. and J. L. Provan, B.Agr.Sc.* | 354 |
| Degeneration Diseases of the Strawberry | *A. T. Pugsley, B.Agr.Sc.* | 358 |
| Butter Production and Export | | 364 |


*Issued by direction of the Hon. E. J. Hogan, M.L.A., Minister of Agriculture.*

## COPYRIGHT PROVISIONS AND SUBSCRIPTION RATES.

The Articles in the Journal of the Department of Agriculture of Victoria are protected by the provisions of the Copyright Act. Proprietors of newspapers wishing to republish any matter are at liberty to do so, *provided both the Journal and author are acknowledged.*

The Journal is issued monthly. The subscription, which is payable in advance and includes postage, is 3s. per annum for the Commonwealth and New Zealand, and 5s. for the United Kingdom and Foreign Countries. Single copy, Threepence. Subscriptions should be forwarded to the Director of Agriculture, Melbourne, C.2.

## POSTAGE RATES.

The postage required for this issue is:—To Australia and New Zealand, 1d.; to United Kingdom via France, 2d.; to United Kingdom via All-sea route, 1d.; to other British Possessions, 2d.; to U.S.A. and Foreign Countries, 3d.

A series of the most important articles ever written on Australian Bloodstock, under the title —"50 Best Australian Racehorses," is now appearing in "The Leader." Be sure to read these articles.

The Man on the Land finds much to interest him in the fully reported country news and the special sections that deal with Breeding, Agriculture, Horticulture, Mining and Market Reports. BUY "THE LEADER" TO-DAY, Victoria's leading country Weekly. David Syme & Co., 233 Collins St., Melbourne, C.1 MX 4731

# INDEX TO ADVERTISEMENTS

## FRONT SECTION

Gippsland and Northern Co-operative Coy. Ltd. (Seeds) ... ... opp. p. 323

Goodyear Tyres ... ... ... opp. p. 322

International Harvester Coy. of Australia Pty. Ltd. (Separators) ... ... ... v

Law Somner Pty. Ltd. ... ... ... vi

Leggo, Victor, & Farmers Ltd. ... inside cover

H. V. McKay Massey Harris Pty. Ltd. ... iii

Neptune Oil Co. Pty. Ltd. ... opp. p. 331

Rylands Bros. (Aust.) Ltd. ... ... iv

Syme, David & Co. ("The Leader") ... ii

Vacuum Oil Coy. Ltd. ... ... opp. p. 330

Wills, W. D. & H. O. (Aust.) Ltd. ... ... iv
(Right Angle Tobacco)

## BACK SECTION

Australian Cement Ltd. ... ... inside cover

Bodington, R., Pty. Ltd. ... ... ... vii
(Seed Cleaning Machinery)

Cockbill, J. ... ... ... vii

Commonwealth Fertilisers and Chemicals Ltd. opp. p. 347

Evans, Thos. Pty. Ltd. ... ... opp. p. 354

Friesian Bull Calves for Sale ... ... xii

Gerrard Wire Tying Machines Co. Pty. Ltd. ... ... ... ... ... vii

Hardie, James & Co. Pty. Ltd. ... opp. p. 346

Lysaght Bros. & Coy. Pty. Ltd. ... ... ix

Nursery Stock (A. G. Nightingale & Co.) ... x

Red Poll Bull Calves for Sale ... ... xi

State Savings Bank ... ... opp. p. 354

Stud Breeders' Cards ... ... ... viii

Sulphate of Ammonia ... ... opp. p. 346

Trewhella Bros. Pty. Ltd. ... opp. p. 347

Victorian Railways ... ... ... x

White Leghorn Chicks for Sale ... ... viii

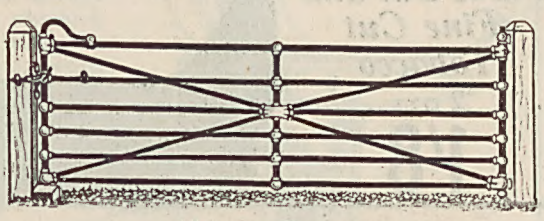
# "STRONG as a SUNSHINE GATE."

"And that means the strongest made."

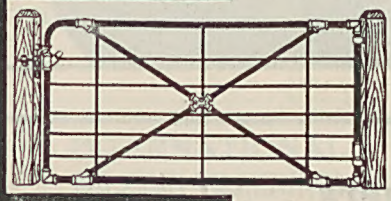
Sunshine Chill-Moulded Joint. Nothing to touch it for STRENGTH

# A GATE FOR EVERY FENCE...

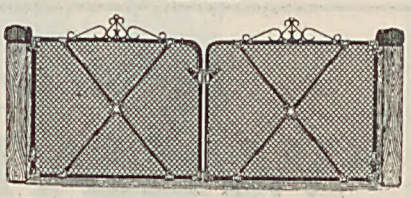
*Every Gate Attractively Priced*



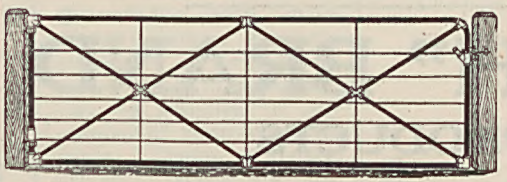
6-bar gate. The cattleman's favourite All sizes.



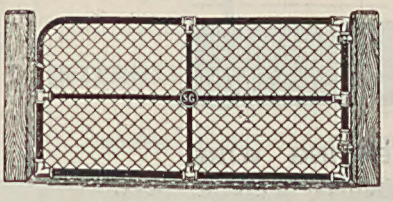
X Stay gate. Sheep proof. Netted type (rabbit proof) also available. All sizes.



Car entrance gates. Two styles; 10 ft. wide. Also garden gates; two styles; 3 ft. and 3 ft. 6 ins. wide.



XX Stay single leaf gates, 10 ft. to 16 ft. wide. Either sheep or rabbit proof.



Sheepyard gate. Also the bar type, without netting. All sizes.

**Ask your local agent for the FREE catalogue, or write direct.**

**ALL METAL... UNBREAKABLE EVERLASTING.. TRUE SWINGING**

## H. V. McKAY MASSEY HARRIS PTY. LTD.

SUNSHINE HARVESTER WORKS, SUNSHINE, W.20, VIC.

Also at MELBOURNE, SYDNEY, ADELAIDE, PERTH, BRISBANE

# A NEW ANGLE

## ON TOBACCO . . .

*A grand smoke from any angle.*

**RIGHT ANGLE**

*Flake Cut and Fine Cut Tobacco*

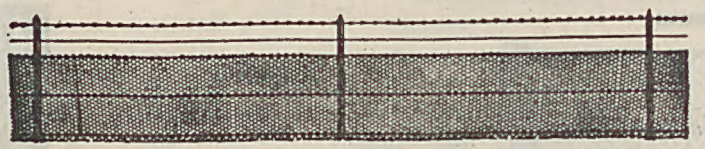
2 ozs

1/8

*For Australian Farmers . . !*

# "WARATAH" BRAND

## FENCING PRODUCTS



"WARATAH" WIRE NETTING, FENCING WIRE,
STAR STEEL FENCE POSTS, HINGED-JOINT FENCE, ETC.

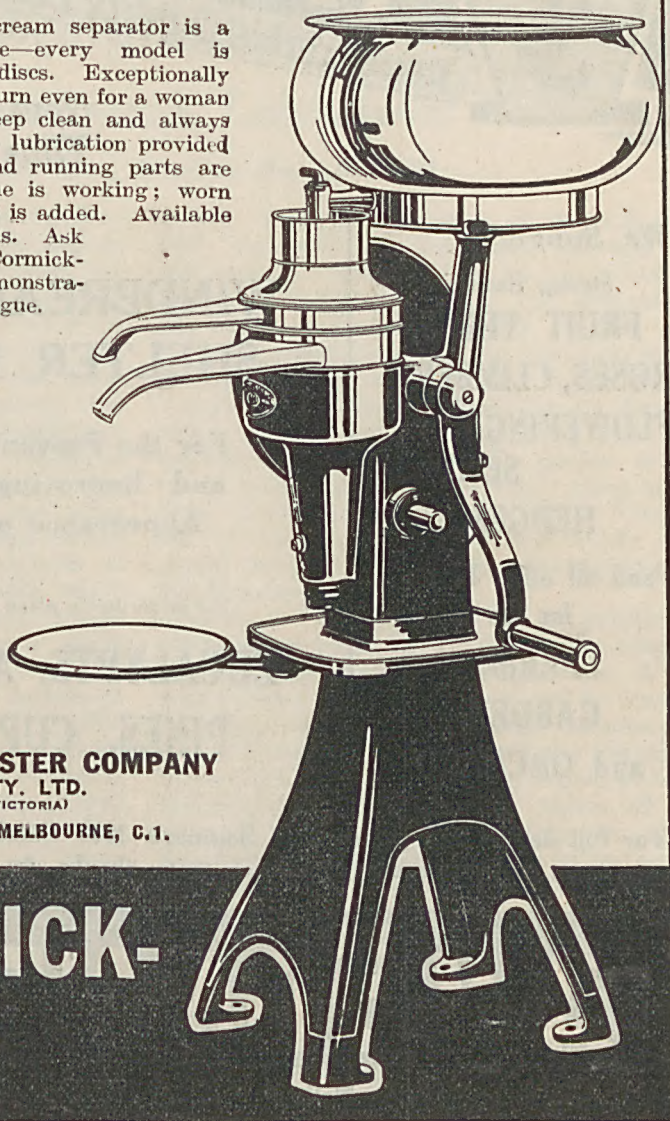
100% Australian from the Ore to the Fence.
Rylands stand behind their Products—Quality equal to any in the World.

Made by **RYLANDS BROS. (Aust.) LTD.** Newcastle (N.S.W.)

Head Office: 422 Little Collins Street, Melbourne

# *A Genuine* BALL-BEARING CREAM SEPARATOR *with Stainless Steel Discs*

● Every McCormick-Deering cream separator is a *genuine* ball-bearing machine—every model is equipped with stainless steel discs. Exceptionally smooth in operation—easy to turn even for a woman or child. Discs are easy to keep clean and always retain their shape. Automatic lubrication provided on all models. All bearings and running parts are thoroughly oiled when machine is working; worn oil is forced out when fresh oil is added. Available in six sizes—35 to 150 gallons. Ask your local agent to bring a McCormick-Deering to your farm for a demonstration—or write us for catalogue.



## INTERNATIONAL MILKING MACHINES

● Available with either straight claw or alternate pulsation. Overhead pulsators fitted to each bail. Can be supplied in any number of units to suit all herds. Engine or electric driven. Write for full particulars.

**INTERNATIONAL HARVESTER COMPANY OF AUSTRALIA PTY. LTD.**
(INCORPORATED IN VICTORIA)
**543-555 BOURKE STREET, MELBOURNE, C.1.**

# McCORMICK-DEERING

LAW SOMNER'S "TIP TOP"

# Trees & Shrubs

Dependable Quality Established over 88 Years

*Now is the Time to Plant!*

*We Supply—*

Strong, Healthy
FRUIT TREES,
ROSES, CLIMBERS,
FLOWERING
SHRUBS,
HEDGES,
and all other Plants
for the
FARM,
GARDEN,
and ORCHARD

FOR

## WINDBREAKS, FODDER, SHELTER FOR STOCK

For the Prevention of EROSION and Improving the Value and Appearance of your Property

*We supply sturdy plants of all the Best Varieties of*

## EUCALYPTS, ACACIAS, OAKS, PINES, CUPRESSUS, ETC.

For full details and prices Law Somner's 1938 Catalogue of all flower, vegetable, pasture, and tree seeds, also roses, trees, shrubs, &c., is now available, post free.

# LAW SOMNER *Pty Ltd*

21-23 Elizabeth Street, Melbourne, C.1. P.O. Box 1232, G.P.O., Melbourne, C.1.

NATIONAL MUSEUM OF VICTORIA

The Journal of the DEPARTMENT of AGRICULTURE of VICTORIA

July, 1938.

# Milling and Baking Qualities of Wheat

## The Departmental Laboratories

*By W. R. Jewell, M.Sc., Agricultural Research Chemist*

CONSIDERATION of the milling and baking qualities of wheat has become increasingly important during the past few years, and now is the concern of all persons connected with the wheat industry, from the farmer who grows the wheat, through the exporter, miller, and baker, right up to the consumer of the baked product. No longer is the wheat breeder concerned solely with the yield and disease resistance of his new wheats; quality is now demanded and striven for, and a certain minimum quality is necessary, irrespective of yield and other characteristics, before a new wheat can receive general approval. The ultimate purchaser of wheat, the miller, is not satisfied with wheat which is easily milled and which returns a high yield of flour of good colour; he also is vitally interested in quality, in an endeavour to supply a flour satisfactory to the baker and uniform in its properties from week to week. The miller frequently has his own chemist and laboratory, with methods of evaluating quality, to enable him to select wheat suitable for his purpose, and to blend different consignments to the best advantage.

With all this activity and interest in the question, it is only natural that new apparatus and new methods should be devised to measure quality of wheat and flour, and a number of important advancements recently have been made in this direction. The Department of Agriculture, in that it is responsible for the production of new wheats and for general advice on wheat growing, is obviously vitally concerned with this quality aspect, perhaps more so than any other body connected with the wheat industry. It was essential, therefore, that its cereal chemical laboratory should contain the very best milling and baking equipment available, together with the most modern apparatus for examining wheat and flour in other ways. The necessity for this is apparent when it is realized that the Department must be in a position to make an authoritative assessment of the quality of the various wheats already commercially grown in the State, of wheats imported from outside Victoria, and of the many new cross-bred wheats constantly being produced by the wheat breeders of this Department.

Owing to the generosity of a number of organizations interested in the wheat industry, combined with government expenditure, it has been possible to realize this aim and to remodel and equip the departmental cereal laboratory so that it is now the equal of any similar institution in Australia. This laboratory is located at State Laboratories, Melbourne, which houses all the chemical activities of the Department. Two new rooms were provided, one for milling equipment and one for baking and other testing apparatus. The millers, bakers, and shippers donated the sum of £650 towards equipment, and further donations of £50 each were made by the Chamber of Agriculture and the Victorian Wheat Growers Association. It is very pleasing to record these very practical proofs of the interest taken by these various bodies. Besides providing for the remodelling of the building

necessary to make available the two new rooms mentioned above, the Government also provided the sum of £762 from the Wheat Marketing Fund, to supplement outside donations for apparatus.

It is the purpose of this article to describe, rather briefly, the equipment available for investigating the milling and baking qualities of Victorian wheat, a description that should be of interest to the farming community and to other readers of this *Journal*. It indicates what strides have been made in cereal work of this nature and is one further instance of the general way in which science is constantly being brought to the assistance of the primary producer.

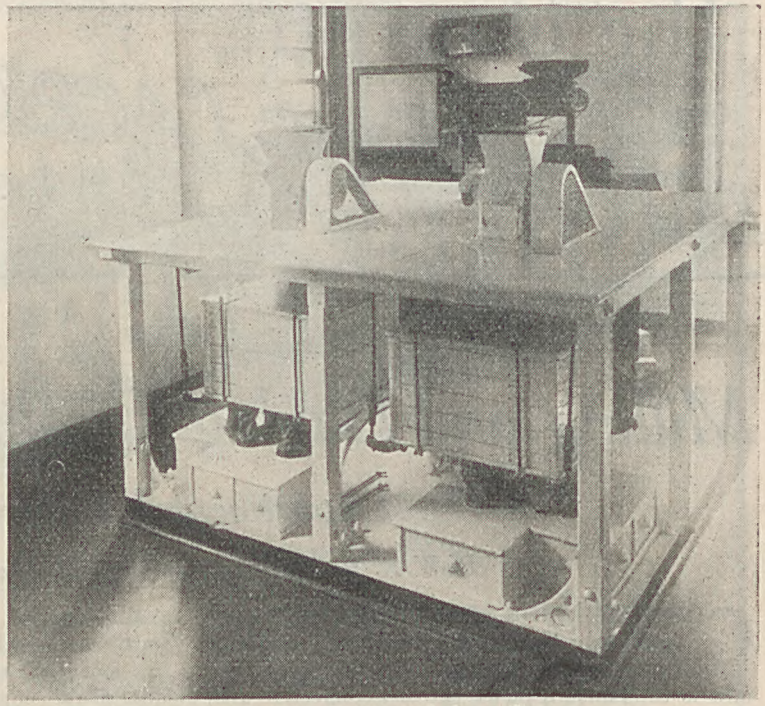


*Fig. 1.—Section of the mill room.*

### *Quality in Wheat and Flour.*

The factors influencing baking quality, and the means usually employed for evaluating such quality, were discussed in an earlier issue of this *Journal* (July, 1935, pp. 331–9) and need not be repeated here, except to say that quality generally is defined as the ability of flour to produce large well-piled loaves, and that the production of large loaves of good texture will depend mainly on two factors: (*a*) the ability of the flour to produce an adequate supply of gas during fermentation or "proofing," and (*b*) the ability of the gluten to retain the gas so produced. Cereal chemical methods are designed to measure each of these properties singly by special tests, to measure them conjointly by means of baking tests, and to determine individual chemical and physical properties which might have some bearing on either or both of them. An appreciation of these points makes the descriptions of the various items of equipment more easily followed.

One other point to bear in mind is that the peculiar feature of wheat flour, which differentiates it from other cereals and which enables it to be baked into bread, is in the proteins particular to wheat. These are commonly known under the collective term of "gluten." As gluten, both as regards quantity and quality, is the most important single property of a wheat or flour, it follows that most consideration has been given to the development of apparatus capable of investigating these aspects of gluten.

### *Milling Section.*

When a wheat is received for investigation, it is first subjected to chemical tests to determine moisture, ash, protein, bushel weight, &c. Such analyses are conducted in the chemical sections of the main laboratories. The wheat must next be milled into flour, and this operation is carried out in the room devoted to milling, a view of which is seen in Fig. 1. The wheat is first cleaned by passing it through a small-scale cleaner, shown in the background of this photograph. Here dust, straw, weed seeds, &c., are removed and the cleaned wheat graded by the removal of extra large, very small, and cracked grain.

Before being milled, the sample is "conditioned" by the addition of sufficient water to that already present in the grain to render it suitable for milling. The moistened grain is allowed to stand over night, the added water thus softening the kernel and rendering the outer skin capable of being easily removed. When flour is required for baking purposes it is milled in the Simon experimental mill shown in the foreground of this picture. This mill is some

twenty years old, but still gives good—if slow—service, producing a high grade of flour with up to 74 per cent. extraction, which compares favorably with that obtained on commercial mills. The mill contains a set of "break" (corrugated) rolls housed at the top left-hand side of the table, and a set of smooth (reduction) rolls at the right.

The break rolls crack the grain and scrape the floury material away from the bran. The material is passed through the break rolls four times, each time passing through a plansifter (set of sieves) shown underneath, which separates break flour, bran, and coarse semolina. These semolinas or coarse kernel particles, are then passed seven times through the smooth rolls, which are adjusted at each reduction. The semolina is broken down and rolled to a fine powder, the material each time passing through another set of sieves which finally gives flour and pollard. The yields of flour, bran, and pollard are determined and the flour used in a subsequent testing.

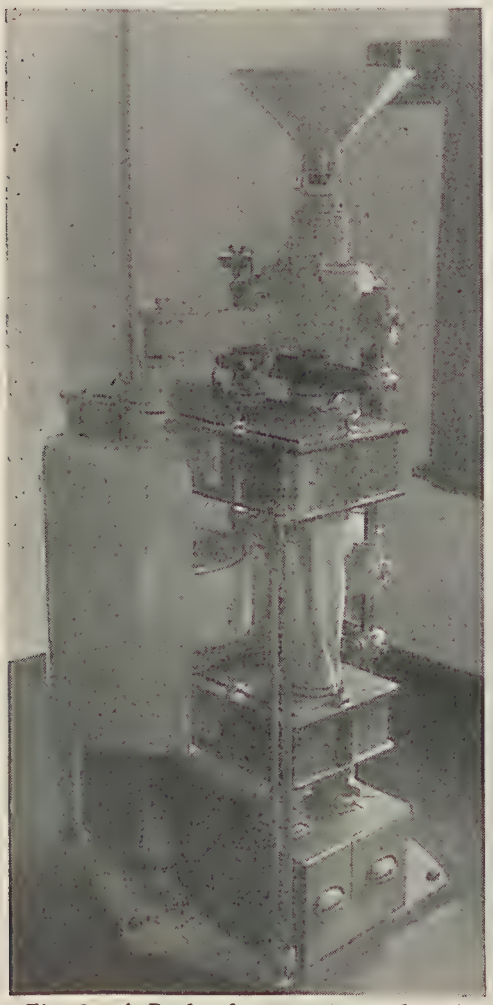


*Fig. 2.—A Brabender experimental mill.*

Part of the new equipment is a Brabender mill, shown in Fig. 2. This is an entirely different type of mill, designed in Germany, primarily to produce flour to be used in the farinograph, as described later. This mill departs from the roller principle and reverts to stone grinding, two sets of conical stones being mounted on the one vertical shaft and driven by a motor not visible in the photograph. The conditioned wheat is fed in through the hopper at the top at a predetermined rate. It passes through the first set of stones, then through an oblong box of sieves seen near the top of the machine. Flour and bran are separated and go direct to drawers seen below, while the remaining unground products pass through the second stones, thence to the lower set of sieves. Both sieves are given a gyratory motion by a belt drive from the main shaft. The mill is very ingenious, and while extraction is lower with this mill, it has the advantage of speed in that a 2-lb. sample can be dealt with each half hour.

In this room is also housed what might be called the "wheat library," a large number of uniform tins in which the various samples of wheat are held for investigation and reference. In addition, permanent samples of all varieties available are retained in glass exhibition jars.

### *Baking Room.*

When all is said and done, the baking test still remains the ultimate criterion of baking quality, and so one would expect this test to form an important section of any cereal laboratory, and this is so. The standard baking test employed in cereal investigations differs somewhat from the procedure adopted by a commercial baker. Here the test is so designed that the flour is the only variant, all other conditions being strictly standardized, so that the actual baking quality of the flour is measured. Because of this, we find quite elaborate equipment designed to control temperature and humidity in proofing and baking ovens.

In the first place the dough, consisting of flour, sugar, salt, yeast, and the requisite amount of water, is mechanically mixed in a Hobart mixer, shown on the extreme right of Fig. 3. This eliminates the human element and ensures

that all doughs have exactly the same mixing. The doughs are proofed or fermented in the proofing cabinet, shown on the extreme left of Fig. 3. In the upper section are instruments that heat and moisten the air, and other instruments which control both heat and moisture, so that the air in the three lower compartments is automatically controlled and kept at a constant temperature and constant relative humidity. The conditioned air is drawn over the instruments by a fan and circulated through the lower sections. By these means, and by working to a uniform time schedule, all doughs are proofed under exactly the same conditions. Eventually the doughs are finally proofed in the baking tin and then baked in the electric oven shown on the right of the proofing cabinet.

This oven is extraordinarily efficient. The temperature is automatically controlled with a high degree of accuracy, and the hearth is caused to rotate so that each loaf moves through the same part of the oven. These measures ensure that all loaves, on any day of the year, are baked under exactly the same conditions.

The final loaf is weighed and examined, and its loaf volume—a very important characteristic—is measured in the loaf measuring machine standing on the floor at the right of the oven. In this machine rape seed is fed into the lower chamber containing the loaf, and the volume of seed displaced by the loaf is its volume.

The foregoing outlines the procedure in the basic baking test. Supplementary tests are also conducted, the only difference being that in these tests additions are made to the basic baking mixture. In one of these small amounts of malt and phosphate are added. Any improvement in loaf volume indicates that the flour is normally low in diastatic activity or yeast food. In another modification, a further addition of potassium bromate is made, to measure the response to mineral improvers and the prospects of the flours improving with age. Other modifications involve an alteration in the proofing time, a procedure that is desirable when investigating reported baking troubles.

While considering Fig. 3, we could enumerate the rest of the equipment shown on the bench on the right. At the back are two other ovens of an earlier and less complicated model. Next is an electrically heated and thermostatically controlled drying oven for moisture determinations, and in front of it is the Farinograph, shown in greater detail in Fig. 4. The dust bin, underneath the bench, should not be overlooked.

### *The Farinograph.*

The Farinograph (Fig. 4) is one of the modern and costly pieces of apparatus. It is a mechanical contrivance designed by Brabender to measure mechanically the properties of a dough over a period of time, and to record them

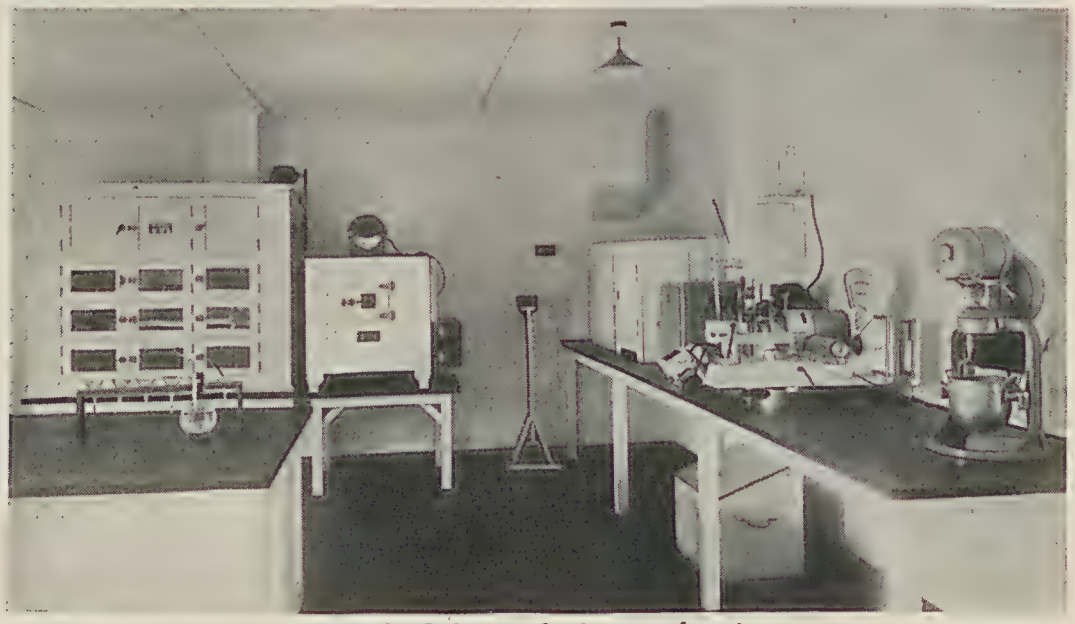


*Fig. 3.—Baking and other cereal equipment.*

*Fig. 4.—The Farinograph.*

graphically in the form of a chart. In the front of the apparatus will be seen a small mixing bowl, a duplicate of which is shown on the left. The blades of this mixer are connected with a motor in the form of a freely-swinging dynamometer. Every variation in the resistance of the dough to the blades is transferred to the dynamometer, which has a tendency to equalize this resistance by turning in the opposite direction. These movements are damped by an oil damper and are transferred by a system of levers, to a scale seen at the rear, and to a pen which records on the slowly moving graph paper at the right of the machine. Mixing bowl and oil damper are both kept at constant temperature by water circulating from the thermostat shown at left centre. This thermostat is electrically heated and is controlled by a thermo-regulator. A motor driven pump constantly circulates the water.

In carrying out the test the weighed amount of flour is placed in the mixing bowl, which is then set in operation. Water is run in from the burette (seen supported above the bowl) until the consistency of the dough, as indicated by the scale, reaches a predetermined figure. The amount of water necessary to do this is known as the "water absorption" of the flour, one of the characteristics peculiar to each individual type. The more water a flour can absorb to give a definite consistency the greater the number of loaves that can be obtained per sack of flour. The duplicate mixer is now placed in the position previously occupied by the other, and the same amount of water, determined in the previous test, is added all at once. The machine is set in motion and the pen commences to record a graph. The experiment is continued generally for ten minutes, by which time any ordinary dough has begun to deteriorate.

A typical diagram is shown in the first example in Fig. 5. It will be seen that the graph can be divided into a number of factors. The thick horizontal line on the paper represents the standard consistency to which the dough is brought. "*A*" represents the dough development time, or the time required for the dough to reach maximum consistency. The shorter this development time, the shorter the mixing time in the bakery. "*B*" is called the dough stability and is the time during which the dough remains at maximum constituency. The longer this stability period the greater the abuse, and the longer the fermentation the flour is able to

withstand. "*C*," or the thickness of the graph, is a measure of the elasticity and distensibility of the dough and the thicker the curve, the more pronounced are these properties and the greater are the possibilities for producing large loaves. After reaching maximum consistency and maintaining this for a period, the physical properties of the dough begin to deteriorate and the graph begins to fall away. "*D*" is a measure of this weakening of the dough and the sooner this occurs, or the greater the amount of weakening in a given time, the less the abuse and the fermentation the flour can stand.

From the foregoing paragraph it will be seen that this one test is designed to reveal a large number of properties of the flour, and the deductions made from the graph can frequently be translated into terms of commercial bakehouse practice. It must be admitted that the interpretation of these farinograms is not particularly easy, but when this has been achieved, very much can be learnt regarding the relative merits of flours or of wheats from which flour has been milled. Fig. 5 also shows a number of graphs typical of what is obtained by markedly different flours. No. II. is a farinogram of a very weak flour. It has a very short dough development time, very little stability, and it falls away very rapidly and markedly. A good average quality flour is depicted in No. III., which shows the characteristics of a flour that is quite suitable for general bakehouse procedure in this city. No. IV. is typical of the flour from a medium strong wheat, such as is now being grown in fair quantity in certain parts of the State.

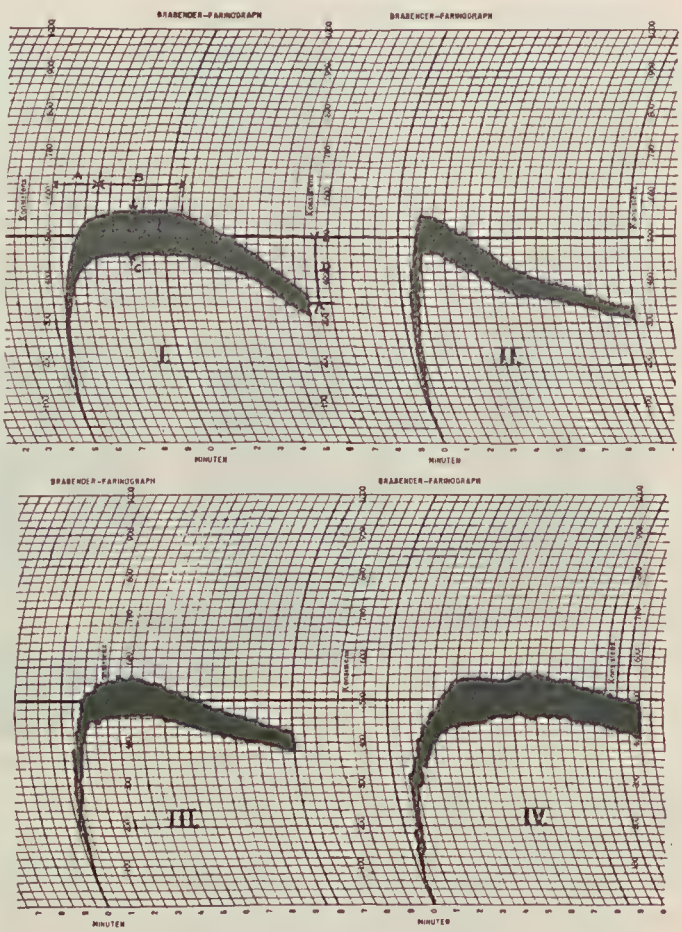



*Fig. 5.—Typical Farinograms.*

## *Other Tests.*

It has already been stated that certain chemical analyses are conducted on the wheat as received. The same is true with flour, where protein, ash, wet and dry gluten, &c., are commonly determined. In addition, the maltose figure is a useful indication of the diastatic activity of a flour and of its ability to produce an adequate supply of gas during the fermentation period. Mechanical means have been devised for measuring gassing power continuously throughout the fermentation period. The high cost of this apparatus is hardly commensurate with the information obtained—at least for the type of investigation in which the Department is primarily interested.

One other simple test may be mentioned, which is regularly conducted on all samples of wheat. It is known as the Pelshenke or wholemeal fermentation-time test. In this test, a certain weight of wholemeal is made into a ball with water and yeast, and placed in a beaker of water, kept at 32° C. in an incubator (not shown in the photographs). The ball first sinks to the bottom, but when the yeast begins to work, the gas produced and enclosed in the ball causes it to rise to the surface. The ball continues to expand until the pressure of gas becomes so great that the ball disrupts. The time is taken from immersion to the first falling away of particles of dough, and the longer the time the better the quality and quantity of the gluten

present. This test came in with a flourish of trumpets a few years ago, and for a while was thought to be the reliable and simple test for which cereal chemists had been anxiously waiting. It was found to suffer from some of the limitations inherent in any one test for quality, and it has now lost favour in certain quarters. In Victoria, however, with the type of wheat commonly met with, it has proved very useful, particularly in the early stages of wheat breeding, where very small samples are available.

### *Conclusion.*

It must be remembered that this article is purely descriptive. No attempt has been made to comment on various types of wheat, nor to discuss the results obtained and their bearing on wheat quality. These aspects will be dealt with in subsequent reports. It will be seen, however, that adequate and up-to-date equipment is available for investigating the milling and baking qualities of Victorian wheats, and much has already been done in this direction. The relative merits of the commonly grown and introduced varieties are known; the effect of season and district on quality has been investigated; information is available as to the quality of numerous new cross-bred wheats and is constantly being augmented. Much remains to be done, but with the equipment now installed, and with extra staff about to be provided, a complete programme of investigation will be carried out, designed ultimately to forward the departmental policy of improving the milling and baking qualities of the wheats grown in this State, both for export and for home consumption.

# *Tubercle Free Herds*

The following herds have been declared free of tuberculosis under the scheme conducted by the Department of Agriculture. Under this scheme a tuberculosis-free accredited herd of cattle is one in which the entire herd has passed two negative, successive, annual physical examinations and tuberculin tests, or, upon disclosure of infection, three semi-annual, successive physical examinations and tuberculin tests applied by a State Veterinarian or by a qualified and registered veterinarian who is approved by the Chief Veterinary Inspector for that purpose.

ACCREDITED TUBERCLE FREE HERDS.

| Herd Number. | Name. | Address. | Number in Herd. | Herd Number. | Name. | Address. | Number in Herd. |
|---|---|---|---|---|---|---|---|
| 1 | State Research Farm | Werribee .. | 259 | 10 | Banyule Stud Pty. Ltd. | Heidelberg .. | 122 |
| 2 | Warragul High School | Warragul .. | 35 | | | | |
| 3 | Payne, A. E. T. .. | "Yarra View," Lilydale | 80 | 11 | McIntosh, John .. | "Burnwood," Merrigum | 31 |
| 4 | Dennis, Mrs. A. A. .. | Frankston .. | 14 | 12 | Black, Mrs. Agnes .. | Mount Noorat | 40 |
| 5 | Lady Talbot Milk Supply Company | Cranbourne .. | 418 | 13 | Black, I. S. .. | "The Cottage," Mount Noorat | 44 |
| 6 | Reid, Ralph G. .. | "Holmwood," Koo-wee-rup | 99 | 14 | Read, John D. .. | "Springhurst Estate," Springhurst | 99 |
| 7 | Harris, J. W. .. | "Rowena," Clyde | 72 | 15 | Kelly, C. .. | "Glenmore," Creighton's Creek, Euroa | 22 |
| 8 | School of Horticulture | Burnley .. | 8 | | | | |
| 9 | Lawrence, P. H. .. | "Rainga," Tarrawarra | 59 | | | | |

# *Fungicides and Insecticides*

On page 293 of the June issue of this *Journal*, under the heading "Concentrated Lime Sulphur (Solution)," the Poly-sulphide Sulphur and Total Soluble Sulphur contents of "Unity" brand should read 19 to 21 per cent. and 27 to 29 per cent. respectively, not 19·21 per cent. and 27·29 per cent. as printed.

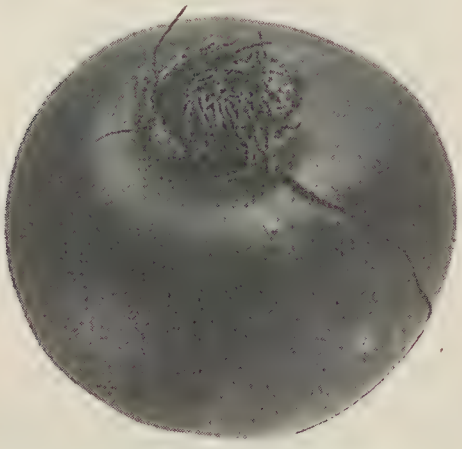
# Root Rot of Onions

*By A. T. Pugsley, B.Agr.Sc., Assistant Plant Pathologist*

THE root-rot or bulb-rot disease of onions is an important problem associated with onion growing in Victoria at the present time. The losses from this disease appear to be on the increase each year, in some districts one to three tons per acre frequently are affected. As well as this direct loss there is the additional expense (approximately 10s. per ton) of picking over and sorting out diseased onions prior to storing. In some cases it is necessary to repeat this process a second time before the onions are finally disposed of.

The disease is caused by the parasitic soil inhabiting fungus known as *Fusarium*. The white mould growth of this fungus and the pink spores can frequently be noticed on diseased onions. The trouble can usually be recognized in the field where affected plants show a yellowish top growth which finally topples over. The roots of such plants are killed so that the plant rests loosely in the soil and may be pulled up easily. Affected bulbs begin to decay at the root end, the rot advancing from the base of the scales upward. The bulbs become soft and the decay may continue until the bulbs are entirely destroyed leaving only the dry outer shells. The rot progresses somewhat slowly so that many infections unnoticed at harvest time develop later in storage.

*Note the rot of the scales which commences at the root end.*



*In many cases the only external evidence of root rot of onions is a sunken area at the root end.*

## *Control Methods.*

The adoption of adequate sanitation measures is the most important phase of the control methods. The destruction of diseased onions by fire and a proper system of crop rotation will materially assist in checking the damage. The common practice of cleaning up diseased refuse in paddocks by turning cattle in is strongly deprecated. Growers have also been known to obtain rubbish, including diseased onions, at the depots and to spread it over the pasture paddocks for stock feed. These practices aid the dissemination of the fungus from infested to clean paddocks and so counteract any benefit derived from crop rotation.

As the trouble is aggravated by wet spells of weather, the gathering of the crop after harvest should not be unnecessarily delayed. Additional precautions are the careful sorting of onions before storing, and the building of the stacks in such a way that they receive as much air ventilation as possible.

## *A Profitable Sideline*

*By A. C. T. Hewitt, M.Agr.Sc., Dairy Herd Manager, State Research Farm, Werribee*

FRUIT growing has tended to become a very specialized industry with the result that thousands of pounds worth of surplus waste fruit are being allowed to rot each year instead of being profitably utilized as stock food. This rotting fruit also harbors pests and thus adds to the liabilities of growers. Specialization has many advantages, particularly in secondary industries. In the primary industries it enables the farmer to study his crop or animals more thoroughly, but many of the new problems, such as erosion, depletion of soil fertility, weeds, insect and fungous pests, that confront primary producers, are encouraged by this specialization.

Pig raising in conjunction with fruit growing has been found to be a very profitable sideline. Monetary profits are not only forthcoming from the sales of pigs, but also inestimable savings will be made in the control of pests, particularly codling moth. Opinions of growers have been obtained in compiling this article, and it is found that in many cases £100 per annum nett profit is being made from pigs, and these growers estimate that, in addition, all labour costs with the pigs are offset by their value in keeping down pests.

The quantity of apples that could be utilized annually in Australia as stock food probably averages about 3,000,000 bushels or 90,000 tons. An accurate estimate is impossible, as the great bulk of waste apples is not handled or recorded, but simply allowed to decay in the orchard. Theoretically, on their food value (starch equivalent) 90,000 tons of apples would rear and fatten 40,000 bacon pigs valued at about £4 each, but, practically, with the necessary supplementary feeding, including grazing, to make more suitable and balanced rations, the equivalent of 80,000 bacon pigs, as a minimum, worth about £320,000, could be produced annually in Australia by apple growers. All other fruits have somewhat similar food values to apples and can also be used for pig production.

Windfall apples, pears, plums, oranges, peaches, figs, and all other fruits may be fed advantageously to stock. Sound fruit may thus be fed when prices are too low to warrant marketing. All farm stock relish fruit which contains many of the special properties of green fodders and root crops for stimulating appetite and digestion. Fruits contain more dry matter than roots, the chief nutrients being sugars, but they are deficient in protein.

Many leading orchardists, including Mr. J. A. Catto, Zonnebeke Orchard, Rheola, Mr. J. E. Shelton, Somerville, and Mr. B. S. Smith, Verney-road, Shepparton, have successfully combined pig raising with fruit growing and have willingly co-operated with the Department of Agriculture in supplying information for this article. Summaries of the methods adopted by Messrs. Catto and Shelton are given later.

Methods of pig farming vary considerably. Some farmers breed, rear, and fatten their pigs, others breed and sell the young as suckers (six to ten weeks old) or as stores, while others again, buy the young as suckers and stores for fattening and do not breed at all. This latter system is recommended only where the grower requires pigs at certain times of the year, or requires less than five or six pigs. Undoubtedly, the most profitable method of pig farming is to run sows and turn all the young pigs into prime bacon.

Fat pigs may be sold as porkers, at three to four months old and weighing 100 lb. live-weight, as baconers at six to eight months old and weighing 200 lb. live-weight, or as back-fatters, usually old sows and boars. Two of the most common failures with pig farmers are that they do not top off their fat pigs properly, nor bring them to the correct weight. These half-fat pigs are sold at very little better than half the price of prime baconers to professional fatteners who spend only a few shillings in bringing them to prime condition. The professional fatteners then sell them at handsome profits. There is no reason why the original pig farmer cannot offer his pigs in prime condition at the correct weights and at a lower cost than the professional fattener, and net for himself the full profit.

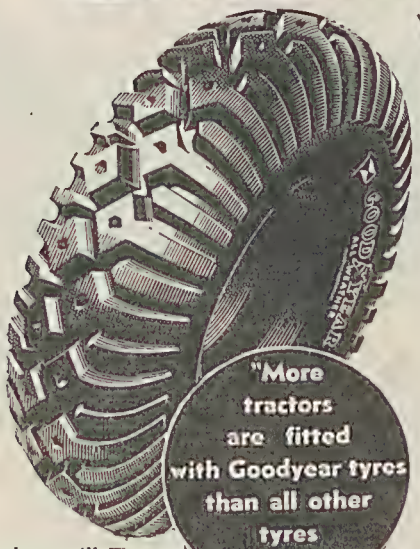
Recently a sound English market has been built up for frozen pig carcasses from Australia. To maintain this market, efforts should be made by every one connected with the pig business to see that the English buyers are supplied with the type of carcass that they require. Pig farmers are advised to carefully go through their pigs just before they reach the porker stage and draught out all those that will not develop into desirable bacon types. These pigs, which will consist of all the short, thick-set, dumpy ones, should be topped off and sold for pork. The correct time to sell a baconer is when it has just stopped growing lengthwise and commences to fill out in depth and width. Usually with baconers this stage is reached when the pigs will dress from 130 to 170 lb. As the most expensive stages of pig raising are the breeding, suckling and young stages (in that order), pigs should always be kept until they have reached their top optimum weight for their particular type. The most desirable type of pig is one that reaches this stage at 140 to 145 lb., dressed weight. Some particularly long, growthy types will make excellent bacon carcasses exceeding 180 lb., dressed weight, but as the demand is not for heavy weight bacon, these should be forced along earlier by heavier feeding for killing at more desirable weights (under 170 lb.).

When well-bred bacon-type sows and boars are mated together, the progeny are remarkably uniform, and porker types should not appear in the litters. For this reason every effort should be made to secure well-bred breeding stock.

Porkers can be profitably produced where there is a local market, but the production of porkers does not lend itself to the open, free range methods of running baconers. Best porkers are sty fed and are fattened right through, whereas baconers are first grown, most economically in the open, and subsequently fattened, the final stages taking

*Pigs intended for bacon should be grown in the open and then fattened in the sty.*

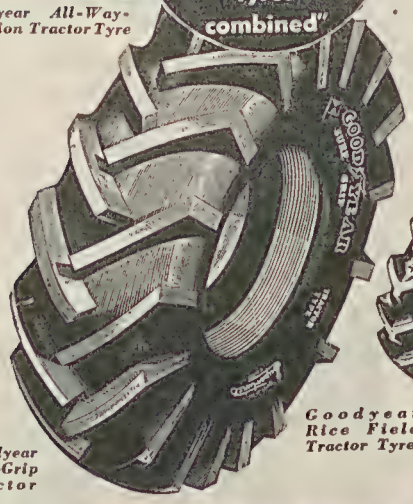
# ONE *is "Made-To-Measure" for* YOUR *soil!*




*Goodyear All-Way-Traction Tractor Tyre*

## The Goodyear Tractor Tyre Line is the Most Complete in the World!

In the Goodyear line is JUST the tyre for YOUR conditions, whether heavy, wet clay, fine sandy soil or anything in between; one or another of these scientifically designed treads will do your work faster and better, and give you maximum savings in fuel, oil, labour, time, repairs and tractor depreciation — with correspondingly greater profits for your work. If you have ordered a tractor, or intend to buy one, give definite instructions to have it delivered on Goodyear Tractor Tyres. Ask your Goodyear Dealer or Tractor Agent to advise you on the tyre best suited to your work.




*Goodyear Sure-Grip Tractor Tyre.*

*Goodyear Rice Field Tractor Tyre.*

*Goodyear Cane Field Tractor Tyre.*

*Goodyear Ribbed Tread (front wheel) Tractor Tyre.*

*Goodyear Implement Tyre.*

TERMS! Goodyear Tractor Tyres and Wheels are available on Hire Purchase Terms. For particulars write the Goodyear Branch (all capital cities).

# GOODYEAR

## TRACTOR TYRES

Send for interesting literature on the advantages of pneumatic tyres for tractors and farm machinery.

THE GOODYEAR TYRE & RUBBER CO., THERRY ST., MELBOURNE.

Name..... Address.....

AM78

# THE STRAIN THAT PAYS

## Make More Money from Pastures—*Sow Only* GOVERNMENT CERTIFIED SEEDS

### G. & N. are Australia's Largest Suppliers

Being a farmers' Co-operative Company better values are made possible.

Immediate delivery.

Govt. Certificates and labels accompany sacks. These labels are your protection.

Specially reduced prices for quantities. Write to-day!

Ask for G. & N. Seed Samples for testing. Sent free on request.

**WE PAY FREIGHT**

on all Victorian orders of £2 or over, cash with order, and all interstate orders of £5 or over.

IT is not so much the number of stock per acre, but the butter-fat and wool returns per acre that counts. Pastures of higher palatability and productivity are necessary. Sowing Govt. Certified Seeds assures—(1) the finest pastures; (2) prolific growth; and (3) higher feeding value. The seed is tested, harvested and bagged under strict Govt. supervision and is certified under existing regulations.

### G. & N. Announce Special Price Offers

on these following guaranteed genuine specialties:

- N.Z. HAWKE'S BAY STRAIN RYEGRASS;
- CLUNES PERENNIAL RYEGRASS;
- COLAC PERENNIAL RYEGRASS;
- PHALARIS TUBEROSA;
- N.Z. COCKSFOOT;
- N.Z. WHITE CLOVER;
- "DWALGANUP" SUB. CLOVER;
- MT. BARKER SUB. CLOVER.

"Seeds for Sowing"

**GIPPSLAND & NORTHERN CO-OP. CO. LTD.**

*Seed Dept.:* 492-4 Flinders Lane, Melbourne, C.1

Telephone: M 3141 (9 lines) Telegrams: "Gippsnorth" Seed Dept., Melbourne

place in the sty or fattening enclosure. Pigs must be kept growing or fattening as recovery from checks is slow, and eats up all the profits. The growing pig should always be kept in good forward condition.

It is customary for an orchardist to have land other than that planted with fruit trees, which can be used for growing pasture, lucerne, millet, artichokes, peas, or some other forage crop suitable to the locality, and on which the pigs can be grazed when it is not possible to have them in the orchard. A few orchardists have found pigs so profitable that they have nearly as much land sown to forage crops for the pigs as they have under orchard, and they run one sow for every two acres of orchard and rear and fatten all the young pigs. It is estimated that, without developing the pig side of the business unduly, one sow for every five to ten acres of orchard, depending on its productivity, could be satisfactorily maintained.

*The Large White breed is recommended for bacon in Victoria.*

The sows would be mated to farrow in July and January of each year. The litters farrowed in July could be reared and turned into bacon, or sold as suckers as soon as possible. At this time of the year there is a strong demand for suckers, slips, or stores from dairy farmers who have surplus skim milk. The sows would then be bred to re-farrow in January and these litters should all be reared and turned into bacon. The young pigs would be weaned at six to eight weeks old, and turned out into the orchard as soon as harvesting is completed to clean up the windfall fruit, graze the grass and weeds, and root up the codling moth larvae, grubs, and other insects. About two or three weeks before marketing in August or September, these potential baconers would be brought in and topped up before being sold.

The subdivision of the orchard into three or more paddocks, containing varieties that are harvested at different times, will facilitate the grazing and handling of the pigs. This subdivision would also facilitate the growth of green cover crops which would be sown rotationally in the subdivided sections of the orchard as soon as the fruit was cleaned up by the pigs. These cover crops would be grazed by the pigs prior to ploughing in. It has been shown elsewhere by the Department of Agriculture that the ploughing in of a grazed cover crop is as effective in maintaining soil fertility as ploughing in the whole cover crop.

Apples rejected in the packing shed can be stored and fed after the orchard is cleaned up. If the grower has a cool store, the rejects from re-packing will come in useful for feeding purposes late in the season. The storage of surplus apples for subsequent feeding adds to the economy of this sideline. Some growers whose fences do not permit the grazing of pigs in the orchard, pick up all the windfalls, store them in the open, and, as required, feed them to their pigs. This practice does remove a lot of diseased fruit from the orchard, but it increases the labour charges against the pigs. Immature fruit is frequently boiled before being fed to increase its palatability, and reduce its tendency to sour.

### *Supplementary Feeding.*

Since apples have a very low protein content, supplementary feeding, particularly to the young pigs and suckling sows, must be restricted to foodstuffs rich in protein, such as green fodders—pasture, clover, lucerne, or cover crops of oats and peas—skim milk, meat and blood meals, cooked abattoir and fish offal or cooked meat. To all these supplementary feeds an equal portion, on a dry matter basis, of gristed barley, maize, pollard, or other ground cereal grain should be added.

For every 100 lb. live-weight of pigs running in the orchard, after harvest, daily supplementary rations consisting of 1 lb. gristed barley plus 1 lb. meat meal (or their equivalents) should be

*Portable farrowing shelters with automatic feeders at the rear. Note the clean water supply.*

fed in three feeds. When all the orchard is cleaned up and without allowing for any supplementary grazing, the ration for every 100 lb. live-weight of pigs should comprise 18 lb. apples, 1 lb. meat meal, and 1 lb. barley. When the pigs are grazing the cover crops or are in the pasture, 1 lb. barley and as many apples as they will eat can be fed. From weaning the litters until within a fortnight of re-farrowing, the sows should not require any concentrates, as usually sufficient grazing is available for their requirements.

When topping off the pigs prior to marketing, they should weigh about 180 lb. each, and will require 6 to 7 lb. dry feed daily in at least three feeds. This feed should be restricted to gristed grain, pollard, skim milk, and meat meal, and fed as a gruel. If it takes more than two or three weeks to top off the pigs, then they have either been brought in too soon or they have been fed too sparingly during the growing period.

### *Fences, Shelters, Sties.*

Just as with other animals, bad fences and underfeeding lead to the pigs becoming fence breakers. The ordinary farm fence will hold adequately fed pigs that have been properly trained from birth to use open gateways when being shifted about instead of being driven through holes in the fence or partly open gateways, &c. A tight barbed wire, 3 in. from the ground, on an ordinary well kept six to seven wire, wire-netting, or cyclone fence will safeguard against pigs breaking through. Once a pig gets into the habit of breaking fences, it takes a really expensive fence to hold it. Boars should always be kept in a paddock or enclosure fenced for that purpose, while sows when in season or when weaning their young require locking up.

Various forms of cheap portable shelters and lean-tos can be made on the farm and used in the orchards and fattening enclosures. If the iron roofs are covered with straw or other litter, the shelter will be cooler in summer and warmer in winter. The sties for fattening and farrowing will need to be dry and well drained, free from draughts, warm in winter and cool in summer. It will be convenient if they are situated near the fodder barn. To protect the young pigs from being crushed by the sow, a rail round the farrowing sties about eight inches from the floor projecting a similar distance into the sty is necessary. Fresh drinking water is essential and must be continuously available to the pigs.

### *Breeds of Pigs.*

Breeds of pigs common in Victoria, include the Large White, the Tamworth, the Berkshire, the Middle White, and the Large Black. The Gloucester Old Spot, and the Duroc Jersey breeds have been introduced, but are now extremely rare.

The Large White breed or crosses by a Large White boar are recommended in Victoria for bacon. The Tamworth and Large Black also make good bacon. The Middle White and Berkshire are favoured for pork, but sows from these breeds when mated to a Large White or Tamworth boar produce excellent baconers.

Satisfactory porkers can also be raised from breeds and crosses recommended for bacon.

THE FOOD REQUIREMENTS OF PIGS.

| Age in Weeks. | Approximate Live-weight. | Food Allowance (Dry) per Head per Day. | Approximate Nutritive Ratio. |
|---|---|---|---|
| | lb. | lb. | |
| 3–8 .. | 10–25 | ½– 1½ | 1 : 4 |
| 8–12 .. | 25–50 | 1½– 2½ | 1 : 5 |
| 12–16 .. | 50–80 | 2½– 4½ | 1 : 5 |
| 16–20 .. | 80–115 | 4½– 5½ | 1 : 6 |
| 20–24 .. | 115–155 | 5½– 7 | 1 : 7 |
| 24–30 .. | 155–220 | 7 – 9 | 1 : 8 |
| Sows in pig .. | .. | 2 – 6 | 1 : 5 |
| Suckling sows | .. | 8 –14 | 1 : 5 |
| Stock boars .. | .. | 3 – 7 | 1 : 5 |

## *Orchardists' Methods.*

Mr. J. A. Catto, Zonnebeke Orchard, Rheola, keeps ten sows and rears and fattens practically all the young pigs. He uses a Large White boar on Large White and Tamworth sows, and frequently tops the Bendigo and Ballarat markets with his baconers, which are fed apples, skim milk, meat meal, and barley. In addition his pigs are grazed in the orchard from completion of harvest until the buds on the trees begin to swell in early spring, and are also grazed on top-dressed lucerne and pasture.

Mr. Catto tops off his baconers in one-acre paddocks with barley and skim milk, or meat meal, if no skim milk is available, in four feeds daily. The topping off takes from one to three weeks. He keeps the food troughs scrupulously clean and has an abundant supply of fresh drinking water always available. Ample bedding in the shelters greatly assists the pigs in the winter months, while Mr. Catto finds that water in which to wallow is beneficial in the summer. Bacon pigs dressing 140 lb. have been the most profitable size.

Mr. J. E. Shelton, Somerville, runs fourteen brood sows on his 90-acre property which includes 27 acres of orchard. In addition, he rears all the young pigs and sells them for pork at fifteen to sixteen weeks old. The pigs are grazed in the orchard from after harvest until September, and additional grazing is supplied by pasture and such annual crops as millet and artichokes. Mr. Shelton feeds grain to the young pigs and porkers in addition to the grazing and fruit, but he does not feed any concentrates to his sows except when they are suckling their litters.

THE FOOD VALUES OF FODDERS LIKELY TO BE FED TO PIGS ON AN ORCHARD PROPERTY.

| Foodstuff. | Dry Matter. | Starch Equivalent. | Protein Equivalent. | Nutritive Ratio. |
|---|---|---|---|---|
| | % | % | % | 1 : |
| *A. Forages and Unsaleable By-products.* | | | | |
| Apples .. .. | 16·0 | 12 | 0·3 | 40·0 |
| Artichokes .. .. | 20·5 | 14 | 0·7 | 15·1 |
| Pasture, short, succulent | 20·0 | 14 | 4·5 | 2·3 |
| Pasture, flowering .. | 25·0 | 14 | 2·2 | 5·6 |
| Lucerne, flowering .. | 24·0 | 9 | 2·5 | 3·2 |
| Oat cover crop .. .. | 18·0 | 9 | 2·0 | 4·3 |
| Pea cover crop .. .. | 20·0 | 9 | 2·2 | 3·5 |
| Potatoes .. .. | 24·5 | 18 | 0·8 | 17·5 |
| Skim milk .. .. | 9·6 | 8 | 3·6 | 1·4 |
| Butter milk .. .. | 9·2 | 9 | 3·4 | 1·8 |
| Whey .. .. .. | 6·6 | 6 | 0·6 | 9·2 |
| *B. Concentrates, By-products, and Grain.* | | | | |
| Barley .. .. | 87·0 | 71 | 6·8 | 9·7 |
| Blood meal .. .. | 90·5 | 66 | 65·0 | .. |
| Bran, wheaten .. .. | 89·4 | 44 | 9·9 | 4·5 |
| Butter milk, dry .. | 90·3 | 85 | 30·4 | 2·0 |
| Coconut meal .. .. | 90·0 | 77 | 16·4 | 3·7 |
| Fish meal, white .. | 90·0 | 59 | 53·0 | .. |
| Linseed meal .. .. | 89·0 | 72 | 22·2 | 2·4 |
| Maize .. .. .. | 87·5 | 77 | 7·4 | 9·4 |
| Maize gluten (Polly) feed .. | 93·0 | 78 | 20·5 | 2·8 |
| Maize oil meal .. .. | 93·5 | 88 | 17·0 | 4·5 |
| Meat meal .. .. | 90·5 | 84 | 54·5 | .. |
| Oats .. .. .. | 89·0 | 62 | 7·6 | 7·6 |
| Pea-nut meal .. .. | 92·8 | 89 | 36·0 | 1·8 |
| Peas .. .. .. | 86·0 | 69 | 18·2 | 2·8 |
| Pollard .. .. | 89·5 | 69 | 10·6 | 5·6 |
| Skim milk, dry .. .. | 90·0 | 79 | 28·5 | 2·0 |
| Wheat .. .. | 88·5 | 72 | 8·3 | 7·4 |
| Whey, dry (one sample only) | 97·5 | 90 | 13·3 | 5·7 |

## *Fruit for Horses, Dairy Cattle and Sheep.*

It is stated by Morrison (Feeds and Feeding) that horses relish fresh fruit, while slightly injured and damaged fruit may also be successfully fed to them. The importance of feeding fruit, particularly apples, and roots such as carrots, parsnips, swedes, and potatoes, to horses is to aid digestion.

Apples have also been profitably fed to dairy cows. Practical men state that, when fed to milking cows, apples dry up the milk, due to too much acid. More probably the failure of cows to maintain their milk yields, when fed apples, is due to failure to supplement the apple ration with sufficient protein. The addition of 4 to 5 lb. meat meal to 100 lb. apples would make up the deficiency of protein.

Experiments by Hackedorn, Satola, and Bear, comparing maize silage with culled apples, potatoes and carrots as supplementary feeding to wheat and lucerne hay for fattening lambs,

showed that the lambs receiving potatoes made the most rapid gains, but were very closely followed by the lambs receiving apples and those receiving carrots, with the lambs receiving maize silage ranking last.

Surplus fruit can thus be fed to the orchardists' horses, cows, and sheep, but pigs are favoured for cleaning up the bulk of the waste fruit. The keeping of extra horses, cows, or sheep just for this purpose is not recommended.

*Tamworth pigs make good bacon.*

# *Ringworm in Amimals*

RINGWORM, which is caused by a parasitic fungus, is characterized clinically by the appearance of more or less circular patches on the skin. The hair on these patches is at first lustreless and erect, and later falls off leaving the skin bare.

Ringworm is found most frequently on the head, especially around the lips and eyes, the legs, and along the neck, although patches may be found on any part of the body. At first the hairless areas are circular and well defined, but may unite and form large irregular patches, which frequently show thickening of the skin, the outside layers of which flake off in bran-like greyish scales. They are soon covered by crusts due to small vesicles forming and later rupturing. The crusts are at first dirty-grey, but, due to rubbing, they become admixed with blood and serum, and vary in colour from yellow to brown. The hairs which have not broken become glued together, and sores form which alter the whole surface appearance. Beneath the crusts are often observed numbers of small nodules formed by swollen hair roots and resembling millet seed. The skin may become thickened, wrinkled, and project above the surrounding surface.

Ringworm readily responds to dressing with tincture of iodine and other alcoholic preparations. For bad cases it is as well to prepare the skin first, by washing with a warm solution of soap and washing soda, 2 oz. to 1 pint of water. The scabs may be softened with applications of oil. Other suitable treatments are 2 per cent. picric acid or copper sulphate, 4 oz. to 1 pint of water.

The skin immediately surrounding the edges of hairless areas should also receive treatment. It is well to note that man may contract this disease from cattle, and in some cases it has proved very difficult to cure. Infected animals should be isolated, pens disinfected, and rugs, other clothing, tools, &c., treated also.

# Clean Milk and Hygienic Dairy Farm Competition

## Yarra Valley Districts

*Report of Judges, R. T. McKenzie, Senior Dairy Supervisor; R. C. Lorimer and A. Clark, Dairy Supervisors.*

***The dairy and washroom of Messrs. J. P. Simmons & Sons, Lilydale, winners of the Milk Producers' Section.***

FOLLOWING the successful establishment of pasture competitions, herd testing, and other progressive movements in the district the Yarra Glen Agricultural and Horticultural Society, in September of last year, readily agreed to support a Clean Milk and Hygienic Dairy Farm Competition. An enthusiastic committee was appointed, and under the President, Mr. J. M. McIntosh, who had some previous experience in competitions of this kind in England, the conditions under which the competition was eventually held, were drawn up. It was decided that the period of the competition would be from October, 1937, to March, 1938, and that results should be finalized prior to the date of the Annual Show on 19th March.

In order to make the benefits of the competition as widespread as possible, two sections were provided, one for milk producers with a minimum of fifteen cows, and the other for cream producers with a minimum of ten cows. With the establishment of a cheese factory in the district, the latter section was extended to include producers of milk for manufacturing purposes also. A scale of judging points similar to that used in competitions in other districts was adopted, viz. :—(1) Health of cows (including recognition of T.B. testing), maximum 100 points. (2) Absence of mastitis, maximum 100 points. (3) Equipment, maximum 100 points. (4) Dairy practice, maximum 400 points. (5) Sediment test, maximum 300 points. (6) Bacterial count' maximum 500 points. Total maximum 1,500 points. It was decided that there would be a preliminary visit of an advisory nature to all competitors, followed by three judging visits at intervals during the period of the competition. Owing to unforeseen circumstances arising, this

had later to be reduced to two judging visits. To establish a prize fund an entry fee of 5s. was fixed for each section. The fund was later substantially increased by gifts of handsome trophies by Messrs. Sawyer Bros. Pty. Ltd. and Holdenson and Nielson Pty. Ltd., and by generous cash donations by Rigby's Dairy Pty. Ltd., Dandenong Butter Factory Co., Model Dairy Pty. Ltd., Metro. Dairy Farmers' Ltd., and Messrs. Wortley Bros. Provision was made for first, second, and third prizes in each class, and certificates for all competitors who gained at least two-thirds of the total maximum points.

Sixteen entries were received in the milk producers' section, and this was regarded as highly satisfactory for the first competition. An entry of six only in the cream producers' section was somewhat disappointing, and of these only four completed the competition. Although well advertised by the local press, it was later found that many farmers in outlying districts were not aware of the competition until after entries had closed, and this accounted to some extent for the small entry in the latter section.

From the outset keen interest was shown by all competitors, and the majority were quick to avail themselves of any suggestions for improvement in sanitation and dairy practice, realizing that more points were to be gained in these sections than in structural improvements. A glance at the points gained by each competitor will indicate the high standard of sanitation and general cleanliness found on most of the competing farms. Every competitor in both sections gained more than the requisite two-thirds of the total points, and apart from the prize winners each entrant will thus gain a certificate.

### *Milk Producers.*

In winning first prize in the milk producers' section with a score of 1,478 points, Messrs. J. P. Simmons and Sons, Lilydale, recorded an excellent performance, especially in view of the fact that structural improvements to the dairy were carried out during the period of the competition. The dairy is a weatherboard structure, lined with fibro-cement sheets and plain galvanized iron erected on a concrete base, with well drained concrete floor, and suitable ventilation. Water from the town mains is used for cooling, and to reduce the temperature to the desired degree an ingenious contrivance, consisting of a leaden coil through which the water circulates inside an ice box, was in use. A detached washroom, with boiler room adjoining, is conveniently situated, and fitted with trough, water and steam jets. All utensils are carefully hung to drain and dry. The cowshed is a well built galvanized iron structure, semi-enclosed, with excellent fittings and feed troughs, and a sound concrete floor throughout. The whole of the interior is coloured white, with a black dado 2 ft. 6 in. high around the base of the walls and posts. Water is laid on to the shed for hosing floors and hand washing. Clean overalls worn by the milkers and the attention given to dairy work were in keeping with the general atmosphere of cleanliness and neatness of the premises. A feature not often seen was the neatly trimmed grass plots, with concrete and gravelled paths between dairy and cowshed.

The second prize winner, Mrs. A. M. L. Smith, Yarra Glen, also did exceptionally well to score 1,451 points. Having a small farm only Mr. and Mrs. Smith find it necessary to hand feed for the greater part of the year. That this is no

*Mr. S. J. McCosh's washroom and cowshed. Mr. McCosh gained first place in the Cream Producers' Section*

disadvantage as far as the production of clean milk is concerned, provided the feed-mixing rooms are well partitioned off from the milking bails was shown by the fact that Mrs. Smith was one of the few competitors to gain maximum points in the sediment test. The dairy buildings are planned to give convenience in working, and a plentiful supply of both hot and cold water was, no doubt, a factor in the results obtained.

Third prize was awarded to Mr. C. H. Drury, Croydon, who gained 1,444 points. Mr. Drury's dairy buildings are not of modern design, and the dairy is situated rather far from the cowshed for convenient working, but these disadvantages were offset by the scrupulous cleanliness of utensils and the general tidiness of the premises. A good type of boiler is installed in the wash-room.

A fourth prize was awarded to Mr. E. Bevin, Croydon, who was only two points behind his neighbour Mr. Drury. Mr. Bevin does most of the dairy work himself, and the cleanliness of the utensils and dairy premises was highly creditable. A good type of boiler and trough fitted up in a convenient washroom was also a notable feature on this place. Further contemplated improvements indicate that Mr. Bevin will be a keen competitor for higher honours next year. Several other competitors finished only a few points behind the prize winners, and are entitled to the highest praise for their fine efforts.

### *Cream Producers.*

In the cream producers' section, first prize went to Mr. S. J. McCosh, Wandin North. Mr. and Mrs. McCosh are a very enthusiastic young couple who are developing a fine farm out of bush country, and have established a very promising Jersey herd, which is entered in the Standard Herd Test. A visit to the property immediately gives one the impression of careful management, and this is confirmed when milking methods and dairy work come under notice. The dairy buildings are of good design and conveniently situated, and are equipped with adequate washing and sterilizing facilities, and a cream cooler is in regular use.

The second prize winner in this section, Mr. J. R. Serpell, Launching Place, is a young farmer who did exceptionally well, considering that he does all the dairy work himself. He has milked fifteen cows by hand without assistance, but

CLEAN MILK AND HYGIENIC DAIRY FARM COMPETITION, YARRA VALLEY DISTRICTS.

| Name of Competitor. | No. of Cows. | Health of Cows. | Absence of Mastitis. | Equipment. | Dairy Practice. | Wad Test. | Bacterial Count. | Total Points. |
|---|---|---|---|---|---|---|---|---|
| **Maximum points** | .. | **100** | **100** | **100** | **400** | **300** | **500** | **1,500** |
| MILK PRODUCERS' SECTION. | | | | | | | | |
| J. P. Simmons and Sons | 20 | 100 | 100 | 93 | 385 | 300 | 500 | 1,478 |
| Mrs. A. M. L. Smith | 22 | 100 | 100 | 92 | 359 | 300 | 500 | 1,451 |
| C. H. Drury | 16 | 100 | 100 | 96 | 373 | 275 | 500 | 1,444 |
| E. Bovin | 20 | 100 | 100 | 93 | 364 | 285 | 500 | 1,442 |
| No. 5 | 35 | 100 | 95 | 91 | 365 | 290 | 500 | 1,441 |
| ,, 6 | 45 | 100 | 100 | 91 | 374 | 295 | 480 | 1 440 |
| ,, 7 | 70 | 100 | 100 | 89 | 357 | 280 | 500 | 1,426 |
| ,, 8 | 37 | 100 | 95 | 87 | 357 | 285 | 500 | 1 424 |
| ,, 9 | 50 | 100 | 100 | 96 | 363 | 265 | 498 | 1,422 |
| ,, 10 | 40 | 100 | 98 | 81 | 365 | 265 | 500 | 1,409 |
| ,, 11 | 23 | 100 | 100 | 92 | 373 | 275 | 466 | 1,406 |
| ,, 12 | 20 | 100 | 90 | 86 | 344 | 275 | 500 | 1,395 |
| ,, 13 | 60 | 100 | 94 | 78 | 345 | 275 | 500 | 1,392 |
| ,, 14 | 90 | 100 | 99 | 78 | 341 | 270 | 500 | 1,388 |
| ,, 15 | 60 | 100 | 100 | 88 | 335 | 275 | 400 | 1,298 |
| CREAM AND MILK FOR MANUFACTURE SECTION. | | | | | | | | |
| S. J. McCosh | 12 | 100 | 100 | 90 | 352 | 270 | 500 | 1,412 |
| J. R. Serpell | 20 | 100 | 100 | 89 | 335 | 275 | 500 | 1,399 |
| J. M. Siggins | 35 | 90 | 100 | 84 | 345 | 275 | 500 | 1,394 |
| No. 4 | 40 | 90 | 100 | 74 | 323 | 275 | 500 | 1,362 |

[*Continued on page 331.*

# World Consumption of Wool, 1937

SHARP contrast in general conditions, activity, and prices in the wool-using industries of the world during the year 1937 are clearly outlined in the statistics published in the Imperial Economic Committee's annual review of wool consumption—"World Consumption of Wool, 1937."*

The year opened with rising wool prices, following a keen general demand from all consuming countries. Activity in wool-using industries was at the peak of recovery from the relatively low levels of 1934–35—particularly in the United Kingdom and the United States, the two largest wool consumers—and the consequent healthy statistical position of wool at the close of the 1936–37 selling season was one of the chief factors in maintaining prices of semi-manufactures and manufactured goods at high levels during the summer months.

The new season (1937–38) opened with a sharp drop in wool prices. Industrial activity in most countries began to decline, and the prospect of curtailed wool purchases by the United States and Japan was not sufficiently offset by a slight improvement in German, Italian, and French competition. The continued weakness of the market intensified the lack of confidence in the general outlook. The usual recovery from the seasonal quiet period in July–August was thus definitely retarded; unemployment in the wool textile industry increased, and wool-users contended themselves with operating for immediate requirements only. Between September and December wool prices fell by from 25 to 30 per cent. and the slight recovery in December was not maintained.

The general factors leading to this sudden reverse were largely international, although in individual countries special circumstances accentuated the trend. In the United Kingdom, retail sales had not kept pace with the increased output of 1936 and 1937, and stocks of finished goods in first hands were reported to be larger than usual towards the end of the latter year. The combing industry was also adversely affected by the loss of the Chinese market, and the further curtailment of German purchases. In the United States, a similar accumulation of stocks of manufactured goods, following a period of extremely high wool consumption, coincided with a general industrial recession. Increased labour and production costs in France, combined with financial and political uncertainties, curtailed output, while Japan entered upon a system of planned restriction of wool consumption similar to that already in operation in Germany and Italy.

These tendencies, states the review, do not, therefore, encourage the belief in a speedy return to the relatively favorable conditions of the early months of 1937. Prices during the first quarter of 1938 showed signs of stabilization at the reduced level—a factor which may arrest the tendency towards substitution of cheaper fibres. Stocks of wool have naturally shown some increase, but imports during the opening months of the 1937–38 season have been, in most cases, below normal, and stocks have, as yet, not accumulated to any extent in consuming countries; in the case of Japan a definite fall has taken place.

Estimated available supplies excluding variations in stocks of clean scoured wool in the ten principal consuming countries, whose consumption represents from 80 to 85 per cent. of world supplies, amounted to some 1,800 million lb. in 1937, about 86 million lb. more than in 1936, and the highest total recorded in recent years.

With the exception of the United States and the Soviet Union, both of which showed sharply increased supplies in 1937, consuming countries depend for the most part on imported supplies. In 1937, however, the United States supplemented its home produced supplies by unusually large imports, but the increase in the Soviet Union's supplies was due largely to greater domestic production. Imports into Japan also reached a record high level in 1937.

These increases in imports more than compensated for the sharp fall in imports into the United Kingdom which were the lowest since 1934. Little change occurred in the quantities of wool retained by Germany, France, Belgium, and the Soviet Union, but those of Italy were about double the low 1936 imports, though still well below those of any other recent year.

World trade in wool manufactures showed some expansion in 1937, but world exports of tops and yarns declined slightly. The United

* Supplement to "Wool Intelligence Notes," price, 2s. 6d., 2s. 11d. Post free.

Polymer Process Produces
*Highest Anti-Knock Petrol...*

and the higher the anti-knock quality of the fuel the greater the power and mileage. New Super Plume is unsurpassed in anti-knock quality—it's now made by the Polymer Process. Change to Super Plume and enjoy its amazing acceleration, power and economy

CONTACT! . . . and a split-second start with the Winter-grades of Mobiloil. World's leading Airlines get flashing starts at below zero!

Change to Winter-Grade Mobiloil yourself for full protection at all speeds and temperatures.

*New*

# SUPER PLUME

Made by the
Polymer Process

For the Eradication of Orchard and Garden Pests

# NEPTUNE SPRAYS STAND ALONE

THE better quality of NEPTUNE Sprays is always obvious by comparison with others. NEPTUNE Sprays conform to the highest standards, and they are consistently uniform in strength and quality. Successful orchardists recommend them. Try them yourself and prove that they're better.

Neptune Prepared Red Spraying Oil ("A", "C", or Heavy Base).
Neptune Palsol (Prepared Pale Oil).
Neptune Clarifol (Winter White Oil).
Neptune White Spraying Oil (Summer Spray).
Neptune Lime Sulphur Solution (Clear, amber-coloured, free from sludge).
Genuine Macclesfield Bluestone.
Berger's Arsenate (Powder or Paste).
Colloidal Lead Arsenate.
Genuine Black Leaf 40.
Powdered Sulphur.
Chemical Sulphur (23871).
English Bluestone Snow.
Neptune Lime.
Copper Spray.
Neptune Spray Spreader.

*Ask for a copy of our hand-book, "Clean Fruit," which gives a wealth of information on all spraying matters.*

**NEPTUNE OIL CO. PTY. LTD.**
All States.

Kingdom accounted for about half of the total exports of wool tissues from European countries, with Italy and Germany providing the bulk of the remainder. Japanese exports were slightly lower than in the previous year, reversing the upward trend in evidence since 1931.

France again took first place as a world exporter of tops, providing 43 per cent. of world exports, as compared with 34 per cent. supplied by the United Kingdom. Though exports of yarn continued to decline, the United Kingdom's exports comprised about 28 per cent. of the world total, as compared with Belgium's share of 16 per cent., while France and Germany contributed 13 per cent. each, and Czechoslovakia 12 per cent.

Copies of the review are obtainable from His Majesty's Stationery Office, Adastral House, Kingsway, London, W.C.2. The price of a single copy (including postage and exchange) is 3s.

# *Clean Milk and Hygienic Dairy Farm Competition*

(*Continued from page* 329)

during the period of the competition he reconstructed his dairy buildings and installed a milking machine plant. The cleanliness of the utensils was highly creditable.

Third prize went to Mr. J. M. Siggins, Steele's Creek. Formerly a business man, Mr. Siggins took up farming for health reasons about four years ago, and has become keenly interested in dairying and pasture improvement. He is ably assisted by his son and daughters. A new combined dairy and washroom was recently built on this property, and is equipped with the necessary washing and sterilizing outfit. Clean white overalls worn by all the milkers was a highly commendable feature, and was in keeping with the general cleanliness and care with which the dairy work was carried out.

***Mr. J. M. Siggins' farm homestead at Steele's Creek.***

The competition was brought to a most successful conclusion at Yarra Glen Show on 19th March, when Mr. W. H. Everard, M.L.A., addressed the gathering, and introduced Mr. J. M. Kerr, Superintendent of Dairying, who presented the trophies to the prize winners.

In the course of his remarks Mr. Kerr commended competitions of this nature for their educational value, and stressed the necessity for cleanliness and efficient dairy practice in the production of milk and cream.

In order that competitors and dairy farmers generally may take full advantage of the results of this competition to correct faults in sections where points were lost, it will not be out of place to draw attention to a few features in the results. In the milk producers' section, no competitor gained maximum points for cooling milk. Forty-five points were allotted for milk cooled to 55° or under. Allowances were made for variations in normal temperatures, and the points gained varied from 20 to 40. This seemed to indicate that the supply of water for cooling milk, and cooling methods could be improved on most farms. Only two competitors gained maximum points in the sediment or wad test, indicating that greater care could be exercised in milking methods, particularly in the washing and drying of cows' udders, and brushing flanks, and in keeping the shed atmosphere free from dust during milking operations. These matters are not mentioned in any spirit of criticism, but with a desire to assist dairy farmers to correct faults in these or any other sections where points were lost. To further assist in this way, any competitor who desires, may obtain a list of points allotted to him, upon application to the Secretary or Judges.

# London Markets

## Weekly Prices

The following information as to prices offering in London for the principal Victorian primary products has been taken from cablegrams received each week by the Department of Agriculture from the Victorian Agent-General in London.

| Product. | | Price for Week Ending— | | | | |
|---|---|---|---|---|---|---|
| | | 27th May. | 3rd June. | 10th June. | 17th June. | 24th June. |
| | | *d.* | *d.* | *d.* | *d.* | *d.* |
| Lamb, 1st quality, Victorian | 29–36 lb. | 7 | 7 | 7 | 7 | 7 |
| Lamb, 1st quality, Victorian | 37–42 lb. | 7 | 6⅞ | 6⅞ | 6⅞ | 6⅞ |
| Lamb, 1st quality, other States | 29–36 lb. | 6⅞ | 6⅞ | 6⅞ | 6⅞ | 6⅞ |
| Lamb, 1st quality, other States | 37–42 lb. | 6¾ | 6¾ | 6¾ | 6¾ | 6¾ |
| Lamb, 2nd quality, Victorian | 28 lb. and under | 7⅜ | 7⅜ | 7⅜ | 7⅜ | 7⅜ |
| Lamb, 2nd quality, Victorian | 29–36 lb. | 6⅞ | 6⅞ | 6¾ | 6¾ | 6¾ |
| Lamb, 2nd quality, other States | 28 lb. and under | 7¼ | 7¼ | 7¼ | 7⅜ | 7⅜ |
| Lamb, 2nd quality, other States | 29–36 lb. | 6¾ | 6¾ | 6¾ | 6¾ | 6¾ |
| Lamb, 3rd quality, all States | 28 lb. and under | 7 | 6⅞ | 6⅞ | 6⅞ | 6⅞ |
| Lamb, 3rd quality, all States | 29 lb. and over | 6⅝ | 6½ | 6½ | 6½ | 6½ |
| Mutton wethers and/or maiden ewes | Under 40 lb. | 4 | 3⅞ | 4 | 4 | 4 |
| Mutton wethers and/or maiden ewes | 41–48 lb. | 3⅞ | 3¾ | 3¾ | 3¾ | 3¾ |
| Mutton wethers and/or maiden ewes | 49–56 lb. | .. | .. | .. | .. | .. |
| Mutton ewes | Under 40 lb. | 3¾ | 3¾ | 3⅞ | 3⅞ | 3⅞ |
| Mutton ewes | 41–48 lb. | 3½ | 3½ | 3½ | 3½ | 3½ |
| Beef, frozen ox hinds | 145–210 lb. | .. | .. | .. | .. | .. |
| Beef, frozen ox crops, weights corresponding | | .. | .. | .. | .. | .. |
| Beef, chilled ox hinds | 145–210 lb. | 5 | 5¼ | 5¼ | 4⅞ | 4½ |
| Beef, chilled ox crops, weights corresponding | | 3½ | 3⅜ | 3½ | 3¼ | 2⅝ |
| Pork, Australian 1st quality | 60–80 lb. | 6¾ | 6⅞ | 6⅞ | 6⅞ | 6⅞ |
| Pork, Australian 1st quality | 81–100 lb. | 6¾ | 6¾ | 6¾ | 6¾ | 6¾ |
| Pork, New Zealand, 1st quality | 60–80 lb. | 6¾ | 6⅞ | 6⅞ | 6⅞ | 6⅞ |
| Pork, New Zealand, 1st quality | 81–100 lb. | 6¾ | 6¾ | 6¾ | 6¾ | 6¾ |
| | | *s.* | *s.* | *s.* | *s.* | *s.* |
| Bacon, Canadian | per cwt. | 91 | 91 | 92 | 95 | 96 |
| Bacon, Empire (cured in England) | per cwt. | 89 | 89 | 89 | 90 | 92 |
| Bacon, Danish | per cwt. | 98 | 98 | 98 | 98 | 99 |
| Butter, unsalted, choicest grade | per cwt. | 124 | 122 | 121 | 118–120 | 123 |
| Butter, unsalted, 1st grade | per cwt. | 123 | 120 | 120 | 116–117 | 121 |
| Butter, unsalted, 2nd grade | per cwt. | .. | .. | .. | .. | .. |
| Butter, unsalted, pastry grade | per cwt. | .. | .. | .. | .. | .. |
| Butter, salted, choicest grade | per cwt. | 121–122 | 119–120 | 117–118 | 116–118 | 121–122 |
| Butter, salted, 1st grade | per cwt. | 120–121 | 117–118 | 117 | 115–116 | 120–121 |
| Butter, salted, 2nd grade | per cwt. | 118–119 | 116–117 | 115–116 | 114–116 | 119–120 |
| Butter, salted, pastry grade | per cwt. | 116 | 114 | 112 | 109–110 | 115–116 |
| Butter, Danish | per cwt. | 124 | 122 | 122 | 121 | 125 |
| Market (butter) | | Continued slow prices further declined. | Quiet. | Slow. | Steadier and prices higher at end of this week. | Firm. |

# Nut Culture in Victoria

## The Walnut—Part II.

*By Edward E. Pescott, F.L.S.*

*The first section of the article on walnuts dealing with Seedlings, Stocks, Australian and Introduced Varieties appeared in the February issue of this Journal.*

### Soils.

The old walnut trees (illustrated), which are growing practically wild in hills in the old mining centres of the north-east, have led people to the conclusion that walnuts would grow anywhere, on any soil, and without cultivation. It has been pointed out that these few are the survivors of many, and they represent a few very hardy specimens.

Plantings on light or on shallow soils have failed. Walnuts require a very good quality soil, which is deep and well drained. The land should not only be cleared of timber, but also all stumps and large roots should be grubbed out.

*Long stakes which act as supports for the strong growing grafts.*

Generally speaking heavy clay soils, strong alluvial soils, and loamy soils with a good deep clay subsoil are satisfactory. A good supply of organic material is desirable. It has been stated previously that the Murray flats are of the type of soil suitable for walnut growing, as are the flats along the southern and eastern rivers. While a soil with a good well-drained subsoil is recommended, the subsoil should never be a dry one. Hill country, unless the soil conforms to the requirements, should be avoided. It should further be remembered that good cultivation is essential, and that a hilly location might suffer considerably from soil erosion.

### Climate.

While the walnut is native to temperate climates, there are certain factors to be considered. It certainly likes a warm climate, but not one too hot. Good long summer temperatures are essential. Exposure to hot winds should be avoided; but this end can be attained by planting shelter trees for windbreaks. The principal limiting factor is the occurrence of spring frosts, but these can be combated by using oil or briquette heaters. A further consideration would be the planting of varieties that flower late, after the danger from frosts had disappeared.

### Working and Re-working.

Seedling walnuts are worked either by budding or grafting. There are various methods of propagation. In some places it is claimed that the bark graft is the easiest and best method; in others, the patch or shield bud method is advocated. Budding or grafting on yearling seedlings should be adopted; but which method, of all those available, is the best is difficult to say. It is very often a matter of suitable climate and

*A Franquette walnut worked at three different positions on black walnut stock.*

season. Further, this is work for the professional nurseryman, and the amateur will not always meet with success.

In re-working, that is in changing the variety of a large tree, or in working an old seedling over to an established variety, the method to be adopted is the bark graft. The tree is thinned out in winter, the limbs to be re-worked are cut back, a few only being necessary, and the graft inserted in early spring. This graft is tied and sealed in the usual way. A few growing limbs are left, to be cut out later in the year. As the resultant growths are very vigorous, provision must be made whereby long and strong stakes are firmly tied to the trunk and the limbs, as illustrated, so that the strong growing grafts may have a support that is satisfactory in every way.

### *Preparation for Planting.*

When preparing an area for planting it should be cleared and subsoiled. It would be a further advantage if the grove were underdrained. If the location of the grove is in an irrigation area all drains and ditches should be established before planting. Deep soil preparation is very necessary, as not only are walnuts deep rooting, but also the modern walnuts on the black or hybrid stocks develop a very large and strong root system in the nursery, and the young trees must be planted in the grove, at the same depth at which they were growing in the nursery.

### *Planting.*

In planting, the distance between the trees varies in different countries. Many old walnut trees have a spread of 50 or 60 feet. These, of course, are individual specimens, and untrained or unpruned. Walnuts soon become widely spread trees, with an equally widespread root-system. In some parts of California the trees are planted from 60 to 70 feet apart. In the north-east of Victoria the trees are planted 45 feet apart, and although these trees are only twelve years old, they are almost meeting. In a good soil, therefore, it would be very unwise to plant the trees closer than 35 feet apart. If a sufficient area be available, then 45 feet would be a better proposition. If this latter distance were decided upon, that would allow for 22 trees per acre if planted on the square system, which is the best.

Now that many of the walnut varieties are precocious bearers, the waiting period for from fifteen to eighteen years for a crop is reduced to a period of three to five years. So that the question of finding or creating an income until such time as the trees become profitable is not such an urgent one. At the same time the distance between the trees is very considerable, and it is perhaps a wise procedure to utilize some of the space for a few years, until the trees are really profitable.

There are several ways of doing this. Filler trees of quick bearing types of fruit may be planted between the walnuts. The climate and latitude

will help in deciding this. Thus in a warm climate peaches, almonds, and apricots may be interplanted; in a cooler climate their place may be taken by plums or cherries. Small and annual crops may be planted in a land in the middle of the row spaces. Such crops would consist of strawberries, beans, peas, potatoes, tomatoes, cape gooseberries, or even of flowers for the market. It has often been found that these crops are most acceptable, seeing that they would all require manure, and thus the soil would not be so impoverished as it would be if fruit trees were planted.

*A young walnut grove at Gapsted—about nine years old.*

In any case, all filler trees must be removed and all cropping cease after about eight years. It may even be necessary to cease before this. A close watch should be kept on the grove, and if any trees show any signs of a reduction of growth, or of any weakening, all filler growths should be stopped at once.

In windy localities it may be necessary to stake the trees, but with the strong and vigorous root system of the black walnut stock, this is not always necessary.

An old time method of planting was to plant nuts in the places where the trees were to grow. Two or three nuts would be so planted, and later the strongest seedling would be selected to remain. But as the day of seedlings has gone, this method is of course obsolete. Another method is for nuts of the black walnut or any other stock to be so planted, and when the resultant seedling is strong enough, to bud or graft

*An old seedling walnut at Wandiligong.*

it over to the selected variety of nut. A variation of this method is to plant out seedlings of the stock, having them established for a year before working. Both of these methods aim at a more or less undamaged root stock. But they are not recommended. The production of the crop is delayed for a year or more, and besides it is not every one who can expertly bud or graft the walnut.

The most satisfactory method is usually to purchase good trees from a reliable nurseryman.

### *Cultivation and Manure.*

It is essential that cultivation shall always be plentiful and clean. There is a tendency when the trees are small and the spaces between them are so large, to cultivate only near and around the young trees. Of course, if filler work is being carried out, this provides the necessary cultivation. The cultivation usually practised in orchards should be carried out in the walnut grove, especially in summer, when it is necessary to have a very cool soil. Further, weed elimination should always be aimed at.

As to manuring, no experimental or test work has been done in Victoria, and therefore no rules can be laid down for this work, and advice can only be given on general lines. It will be wise for a walnut grower to obtain information from the Department on the nature of the soil type he proposes to use. For chemical manures, the 2–2–1 complete mixture of superphosphate sulphate ammonia and potash is generally suitable for ploughing in in spring. Animal manure of any kind will always be a valuable addition to the soil, and the yearly ploughing under of plenty of greenstuff must be treated as absolutely essential. A green manure crop of peas and/or tick beans, especially the latter, will provide in most districts a splendid mat of green material to be ploughed in for conversion into humus. In certain southern Victorian soils experience may show that oats or barley do better.

In California the Melilotus is largely used, but horse or tick beans are very popular. Lucerne was favoured for some years, but its permanent root system is a disadvantage, and it cannot be recommended for use in Victoria.

### *Pruning.*

Pruning is quite a modern subject so far as walnuts are concerned. The old idea was simply to let the tree grow and produce its crop how and whenever it could. Some trees merely require thinning out, some certainly must be thinned. For instance the Eureka, as well as other types, produces many nuts inside the tree, so that an open tree system is necessary.

It may not even be necessary to prune the tree every year; but as the flowers and consequently the nuts are carried on new wood and new shoots, new wood must be provided for this purpose each year. The old system of lashing the trees with pliant rods again comes under notice. Not only did this work scatter the pollen, but also it broke off many shoots, and the regrowth provided fruiting shoots for the next season. For this purpose, however, it was done at the wrong time of the year, being too late. Late pruning causes bleeding, and this is unwise. Any thinning of either overcrowded limbs or laterals should be done in winter time.

*Showing bleeding of pruning wound—the result of late pruning.*

### *Walnuts for Pickling.*

Walnuts for pickling should be gathered before the inside shell begins to harden. If a strong darning or knitting needle can be easily driven through the green nut then it can still be harvested for this purpose. But if the shell offers any resistance because it is beginning to harden then it is too late.

It is doubtful whether it is profitable to grow walnuts for pickling purposes. Generally speaking prices are better for dried than for green nuts. Where trees are subject to blight, however, and where the nuts, or a large proportion of them, will be lost as a result, then it certainly is profitable to harvest them for pickling. The whole crop may be used for this purpose, as the blight does not damage the fruit until it has begun to harden in the shell.

*A walnut dehydrator at Gapsted.*

### Harvesting.

When the green hulls begin to burst open harvesting should begin. The nuts fall to the ground, where they may remain without damage for a few days. Under good cultural and seasonal conditions the nuts fall readily. It may, however, be necessary to knock them down with long rods, or to shake the limbs either with lengths of wire or by hand. Nuts must not remain on the ground to be sunburnt, or to be discoloured by dust, mud, or rain.

In California the removal of hulls, shells or husks, especially if they are in the "stick-fast" condition, is carried out by submitting them for a short period to the fumes of ethylene gas.

The nuts are periodically collected and stored under shady and airy conditions, where they will dry slowly, and where they will mature with freedom from mould. They may be afterwards washed, and bleached, and again dried.

A bleaching solution found satisfactory at the Hawkesbury Agricultural College, New South Wales, consists of chloride of lime 25 lb., washing soda 18 lb., dissolved in 50 gallons of water, sulphuric acid being added to the clear liquid, drawn from the settlings after the dissolving of the two chemicals, at the rate of 1¼ lb. of acid to 425 lb. of the solution. The time of immersion in the solution is from 5 to 10 seconds. Nuts must be dried immediately.

A commoner method of bleaching is to submit the nuts to sulphur fumes for 20 minutes, after having slightly wet them.

### Machine Processing.

The erection of machinery for cleaning and washing walnuts and for carrying out the process of dehydrating is no doubt costly. The cost of installation is high, and such machinery could be installed only where there is a large grove producing a considerable harvest of nuts. Such machinery and methods are in operation at the Gapsted Nut Plantation in the north-east. This outfit carries out all of the operations of hulling, washing, bleaching, and dehydrating.

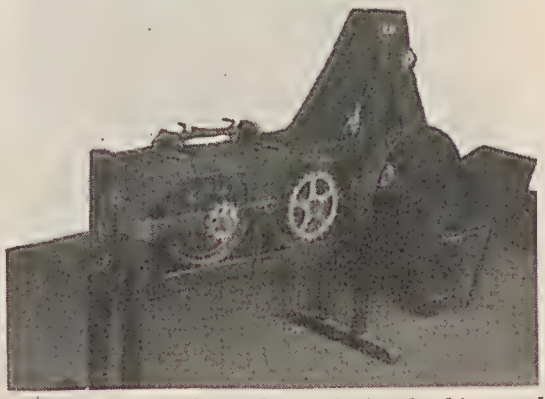
### Crop Results.

Estimation of any crop is difficult, and especially of the nut crop. The crop result will depend not only upon weather conditions such as the incidence of frosts or of hot winds, but also neglect in both cultivation and feeding will cause a material reduction. The prices of walnuts are not subject to a considerable fluctuation at the present time.

An American estimate gives the average yield for California as 800 lb. per acre; but it has been elsewhere indicated that a very old tree will produce up to 7,000 nuts. For a nut of the size and weight of Freshford Gem, this would represent a yield of more than two tons per acre. Many young trees in Victoria, under good conditions, have produced crops of one ton per acre at twelve years old. Incidentally walnuts weigh out at 80 lb. to the bag.

### Insect Pests.

No insect attacks of a serious nature have been recorded in Australia. Such insects as red spider, thrips, erinose, cherry borer, blister mite, San José, and other scales have been noted at



*A machine, used at Gapsted, for husking and cleaning walnuts.*

various times, but the incidence of each attack has been very slight, and it has neither been continuous nor recurring.

Attacks of codling moth at rare intervals have been recorded, and even then the attacks have been very slight. In several States in America this is a somewhat major pest. The larvae enter the young nuts at the stigma end; later they enter at the sheltered spot between two or more nuts. To combat the pest wherever it has reached serious proportions, the trees are dusted with dry lead arsenate; hessian or chemical bands are also placed on the tree.

*Showing erinose on walnuts.*

### *Disease.*

The bacterial blight known as Bacteriosis or *Pseudomonas juglandis* not only infects the nuts at the blossom end, but also on all sides and at all stages of development. Its occurrence is worst in an early wet spring. Black spots appear on the fruit, which when young quickly decays, or when old both hull and kernal decay, leaving a black hollow shell. Black patches and spots destroy the foliage.

There is no known remedy for this disease. Seedlings are very subject to attack, and no seedling can ever be considered as immune; at the same time occasional seedlings show a definite resistance to the bacteriosis. Such seedlings if good croppers, strong growers, and producers of suitable nuts have been selected and put out as named varieties. Working these seedlings on the black, Royal or Paradox seedling stock certainly results in almost complete immunity. The disease is not so serious in its attack in a dry climate, or in a dry spring, and late growing or sprouting varieties are not so commonly infected.

*Developing walnuts attacked by bacteriosis.*

Several fungi have been recorded as attacking the roots of seedling walnuts, but these attacks have almost invariably been noted in areas where the soil has been undrained, and when drainage has been carried out the fungous attack has ceased.

### Conclusion.

There is ample evidence that an extension in nut culture in Victoria can be considered. Imports are still continuing, and the demand is also increasing. Provided that the errors of the past, errors of unsuitable soils and unsuitable varieties and unsatisfactory stocks, are avoided, production should be very much increased.

### *Reference.*

Cole, C. F., Journal of Agriculture, Victoria, Vols. 12 to 14.

# Spirochaetosis or Tick Fever of Poultry

*Compiled by the Veterinary Staff.*

POULTRY tick is a serious and troublesome pest in some of the warmer parts of the State. In colder districts it does not thrive so well. A knowledge of its life history and habits is essential for those poultry farmers whose birds have become infested, in order that steps may be taken to stamp it out. Such knowledge is equally necessary for those whose birds are free of the pest, in order that this immunity may continue.

Ticks in various stages of growth, together with their eggs, may be found concealed in the cracks and crevices of houses and perches. The eggs are of a brownish colour, and are about one-fortieth of an inch or slightly less in diameter. The newly-hatched ticks measure about one-thirty-second of an inch long; the older ones vary in length up to about one-third of an inch. They are oval in shape, flattened, with thin edges, and are covered on the upper surface with small pits of differing sizes. Their colour varies from brownish to grey-black. They are without eyes. Breathing takes place through breathing apertures distributed throughout the body.

The eggs hatch out in from three to four weeks from the time they are laid. The newly-hatched ticks crawl on to the birds, and remain attached to the skin for a few days. They may be seen in small clusters, seemingly blue-black in colour, with their mouth parts inserted into the skin on various parts of the body. The young ticks will usually remain on a bird's body for five days or so. During this time they will get enough nourishment to sustain them for a period, and they then seek hiding places in the perches and walls.

The adult ticks have four pairs of legs, but those newly hatched have only three pairs. A moult takes place in about a week after hatching, when the fourth pair of legs appears behind the third pair. From the time of hatching three moults take place, and they reach the adult stage in about 30 days. In the adult stage, the tick visits the birds at night, and in from 20 to 45 minutes it becomes fully engorged with blood, and returns to the cracks and crevices of the houses and perches.

It is well known that poultry tick will remain alive for two years or more without recourse to the fowl for food. Indeed they have been found alive in woodwork and fences after poultry have been away from the premises for several years. It will, therefore, be seen that complete eradication of the pest, once it has become established, is extremely difficult.

***Ticks at various stages of growth, and Eggs.***
Magnified approximately 3 times.

The effect on birds is very severe. The ticks not only cause them great discomfort at night, and consequent loss of sleep, but also they may introduce a harmful organism into the blood of the bird. This organism multiplies very rapidly, and produces a complaint known as tick fever, which often results in death. The general symptoms of tick fever are a rise in temperature, restlessness, blackness, and shrinkage of comb, prostration and paralysis.

### *Red Mite.*

*The Red Mite* (*Dermanyssus avium*) is a somewhat pear-shaped small mite which is light-greyish in colour when unengorged, and from light to dark-red when engorged. These mites have four pairs of legs and a long rostrum

***Red Mite.***
Magnified 38 times.

or proboscis, and are between ½ and 1 millimetre in length. Their habits are similar to those of the fowl tick; they remain hidden during the day in crevices of the hen-house, under roosts and boards, &c., and in these places eggs are deposited. They swarm out at night and attack the roosting fowls, although they may be found on sitting and nesting hens during the daytime in dark situations.

The larvae (six-legged) hatch in two to six days, and moult in 24 hours, taking their first feeding of bloods as nymphae. Under favorable conditions they pass through the different stages of development in ten days, although two weeks is more common. Their damage consists in—

(1) Reduction of egg production;
(2) Sitting hens leaving the eggs;
(3) Great loss of flesh, unthriftiness, and reduction of vitality; and
(4) They are carriers of Avian *Spirochaetosis* or tick fever.

#### Control of Fowl Tick.

If those houses which are infested are not properly constructed, or are of little value, it is better to burn them and rebuild on new ground. The ground where the old structure stood should be saturated with a strong disinfectant. It is recommended that houses in tick-infested areas be constructed of iron, with the woodwork on the outside, if possible. Angle or tee-iron should, where practicable, be used in place of wood. For economic reasons all houses should be built so that, in case of an outbreak, they can be readily dismantled. They should also be built away from any other buildings or structures. Any wood used must be carefully selected, and should be as free from cracks as possible. In any circumstances, it should be coated with hot tar.

The perches, too, should be coated with tar, and they ought to be so made that they can be easily dismantled, for it is well to remove them every now and again, as there is always the possibility of ticks finding a hiding place between the perches and the walls of the house. Perches can be suspended by wire from the roof, and metal cups, filled with a liquid disinfectant, may be soldered to each wire to prevent the tick from reaching the perches. These cups can also be fitted to most types of perches.

Pepper trees, with their loose bark, have been known to harbour large numbers of the pests. Ticks will travel along an infested fence to a new poultry house, and they and their eggs may at times be conveyed from place to place by egg-cases, crates, utensils, vehicles, wild birds, &c.

A thorough inspection of the poultry farm and plant should be frequently carried out. Regular spraying with a good disinfectant such as sheep-dip will help to prevent the tick from getting a start; but, once the pests have established themselves, it is almost hopeless to expect to reach every crevice where they and their eggs are concealed. If, during the spraying process only a few specimens are missed, it will not be long before a heavy infestation occurs, for they multiply very rapidly. The joints of the perches and crevices of the surrounding woodwork should be regularly treated with sheep-dip

***Young Tick (shortly after hatching) with three pairs of legs.***
Magnified approximately 16 times.

used at full strength. The floors of the houses should be regularly and properly cleaned, and rubbish of all kind, from inside and outside, must be burned.

If proper precautions are taken, it is quite possible to establish a poultry farm in a tick-infested area which may be kept permanently free from the pest.

### Control of Red Mites.

The control measures adopted against red mites are directed most advantageously against hiding places. If spraying is used, an examination of the outside of the houses may show the mites which migrate there when the interior is sprayed. A force spray is effective, using crude oil diluted with kerosene to make a sprayable mixture, although it leaves an oily residue. Other sprays recommended are chloride of lime (6 to 8 ounces to the gallon), and strong sheep-dip. Tar oil may be painted on the perches.

The mite is frequently introduced in contaminated chicken coops or crates, rarely on birds. All introduced coops should be destroyed, or disinfected with boiling water or sprays. Mites will live for three to five months without food—a factor to be considered when vacant buildings are to be occupied with clean stock.

*A Dead Fowl on which the Young Tick may be seen in small clusters on various parts of the body.*

## *Spirochaetosis or Tick Fever.*

Spirochaetosis or tick fever is a disease of fowls, ducks, and geese which is due to infection with a protozoan organism known as a Spirochaete. It may vary greatly in its manifestations and mortality rate. Quite frequently there will be a high death rate among affected birds, combined with a high incidence, or, on the other hand, only a few birds may become affected, and recovery is the rule rather than the exception.

The disease occurs in numerous countries, including various parts of Australia. It is commonly found in the southern parts of New South Wales, and is practically endemic in the poultry yards in the north of Victoria, especially in those districts adjacent to the River Murray. It was formerly thought not to occur in the colder parts of Victoria, south of the Dividing Range, but a number of outbreaks have been discovered near to Melbourne during the past few years.

*Transmission.*—Spirochaetosis may be transmitted from bird to bird by the inoculation of infective blood. The incubation period in experimental inoculation, irrespective of the number of spirochaetes introduced, is usually 48 hours, after which time the parasites multiply rapidly and are readily found in the peripheral blood. The natural transmission, however, takes place through the agency of either the fowl tick (*Argas persicus*) or the red mite (*Dermanyssus avium*).

### Symptoms.

The incubation period after natural infection is seven to nine days, but this is considerably shortened in artificial infection. Most authors describe two forms of spirochaetosis, an acute and a chronic form. In the acute form, birds may actually be found dead without premonitory symptoms. More frequently, however, the affected fowls show a ruffled appearance, with a

drooping head, closed eyes, and a general somnolent aspect. In rapidly-fatal cases there is a general congestion of blood vessels, and a dark comb; but, if death is delayed, jaundice, with a typical reddish-yellow colour of the comb and skin, is a reliable sign, the jaundice being a sequel to the destruction of the red blood cells by the spirochaetes.

Diarrhoea is not uncommon, and toward the end a weakness, or even paralysis of the legs and wings, is found. The height of the disease is characterized by well-marked fever, the temperature reaching 110°–112°F. In cases where death does not occur, the temperature falls gradually, and this is coincident with the disappearance of spirochaetes from the blood stream. In the chronic form, great emaciation, anaemia, and weakness are found. Chickens show a much greater susceptibility than grown fowls, and among them the mortality may be exceptionally high.

Recovery from an attack of spirochaetosis is followed by a well-established immunity. It is a well-known fact that fowls in a district where tick fever is common show a marked resistance to the disease, which, however, frequently makes its appearance in an acute form, when susceptible fowls from a clean district are introduced into an infected poultry yard.

*Post-mortem Findings.*—The commonest and most reliable post-mortem abnormality is a marked enlargement of the spleen, which shows small yellowish-white nodules throughout its substance. The liver may be enlarged. Apart from these two organs, the other signs are those of anaemia generally with jaundice, although in acute cases a congestion of the body is found. Sometimes subcutaneous haemorrhages, resulting from tick bites, are found.

*Diagnosis.*—In life, the examination of blood smears taken from the peripheral circulation is usually sufficient. It frequently happens that birds are submitted for examination which have passed the crisis, and show no spirochaetes in the blood stream. If an autopsy is conducted soon after the crisis, and an enlargement of the spleen is found, smears from the spleen pulp will frequently show spirochaetes. In the chronic form, the spleen may acutally be smaller than normal, and in such cases, or where no spirochaetes can be found, it is impossible to confirm the diagnosis by laboratory methods except by inoculation.

*Treatment.*—As with many other protozoan blood diseases, Avian Spirochaetosis has been successfully treated with organic arsenic preparations. The cost of these drugs, however, precludes their use in any except the most valuable birds, and from a practical point of view it may be stated that spirochaetosis is an incurable condition.

### Control Measures.

As spirochaetosis is a disease transmitted by either fowl tick or the red mite, it can readily be realized that if these parasites are eradicated there will be no possibility of poultry becoming affected with this disease. Control measures for these parasites are given earlier in this article.

# *Hygienic Dairy Produce*

CHOICE butter cannot be ensured from inferior cream merely by earlier delivery of the cream at a factory. It is quite possible for cream from very dirty premises to be graded Choice, and yet butter made from that cream deteriorates rapidly and develops objectionable flavours just as surely as if the cream had displayed its fault at time of grading. No matter how capable a butter-maker may be, he is set an impossible task, when asked to produce a choice butter from inferior cream.

In the production of good butter, the starting point is on the farm. A dirty milker will do irremediable harm, and it is a regrettable fact that there are still instances of milkers failing to cleanse the cows udders or to wash their own hands before milking. There are many jobs on a farm which do not entail such regard for cleanliness as does milking.

Only a lack of thought could be responsible for one starting to milk after performing these other farm operations, without taking some special pains to remove the inevitably acquired contamination. Persons milking cows need to have a sense of personal cleanliness.

# Breeding Poultry for Egg Production

*By H. Clinton, Poultry Expert.*

*Australorps.*

BREEDING poultry for egg production is a very important part of the operations on a poultry farm and requires to be well carried out if future success is to be assured. Of all the breeds used for commercial egg production in this country, the White Leghorn is the most popular, although the Australorp and Rhode Island Red also have been developed to a large extent here. The White Leghorn is essentially an egg-producing breed; it lays white eggs, and belongs to a group of fowls known as "light breeds." While not considered, by any means, to be included in the table class of poultry, large numbers are sold for this purpose on the local market. The Australorp belongs to a group known as "heavy breeds" and lays brown eggs. While this is considered to be a dual-purpose breed, i.e., a good layer and also one suitable for the table, as a table bird it has not the superior quality and the desired colour of legs and flesh possessed by some of the other heavy breeds.

The opinion is often expressed that "like begets like." In general, this is true, but it is true for general and not for particular qualities. It is a fact that a male White Leghorn mated to White Leghorn females will breed birds that are White Leghorns, or that have white plumage, yellow legs, and white earlobes, but of these progeny there will be no two birds exactly alike. We find large and small Leghorns; some lay large eggs and others small eggs, and we find a great variation in the number of eggs produced by different hens.

Selection is made on the basis that like will produce like, but experience has taught breeders that, to secure uniform superiority, they must carry on the selection for generations. If birds with desirable qualities are selected, it should not be expected that all their progeny will have those same desirable qualities, but a better average will be obtained than had no selection been made at all. It is essential that the breeder should realize that the various characters of the fowl are inherited separately.

Breeders are paying more attention to the size of egg as well as to numbers than has been the case in the past. At the commencement of egg-laying trials, the number of eggs, regardless of size, was considered to be of particular importance, and high prices were paid for birds laying about 300 eggs in twelve months. We have since learned that the number of eggs laid is by no means the whole of the story, and that, unless competition birds have a potential breeding value, they are worth very little, and laying trials will have no permanent value. In fact, under such conditions, egg-laying competitions may be more harmful than beneficial, as by breeding from birds of this description the tendency is to neglect other standards of quality which may be of equal importance. The results now obtained in laying competitions throughout the world have demonstrated the possibilities of improving the average egg production on commercial poultry farms, and competitions carried out by State Governments render a very distinct service to the poultry industry, since the records are accepted as official. In the Burnley Egg-Laying Competition, conducted by the Department of Agriculture, the prizes are awarded for the greatest number of first-grade eggs laid in 48 weeks. Every egg is weighed and

*Breeding pens at the State Research Farm, Werribee.*

recorded, and these records are available for examination by any competitor, who can thus compare the performance of various birds and, if he wishes, ascertain the weight of every egg laid by his birds throughout the period of the competition. During the first two months, a first-grade fowl's egg must have weighed not less than $1\frac{3}{4}$ oz., and thereafter not less than 2 oz. It is of interest to note that in this competition the percentage of first-grade eggs laid has increased during the last twelve years from 79.8 per cent. in 1925–26 to 97.6 per cent. in 1936–37.

The housewife dislikes buying small eggs unless they are exceedingly cheap. The small egg generally causes dissatisfaction and tends to lower the average price of all eggs sold, and thus results in a loss to the poultry farmer.

There is no doubt that egg size is inherited. But it must be remembered that, although certain strains may have inherited the factor for laying large eggs, the eggs may decrease in size through errors in feeding and general management. It should be the aim of all engaged in the industry to breed from birds that are free from this undesirable fault, as food and marketing costs are approximately the same as for eggs of normal size. If the small egg is not eliminated, there is also the risk that they may be used for incubation, resulting in a general deterioration of the flock and an increasing number of small eggs. It is true that some large birds lay small eggs and some small birds lay large eggs. It is a fact, however, that loss of weight within a breed is usually followed by laying of small eggs and degeneracy in that breed.

Inbreeding, is the mating of relatives. There is what is called "close inbreeding," as full brother and sister mating, and there is inbreeding of very distant cousins, which certainly could not be regarded as close inbreeding. The mating together of males and females that are full brothers and full sisters is the closest form of inbreeding that can be practised. The final results secured under any form of inbreeding depend, to a great extent, upon the kind of stock used in the original inbred mating. It has been observed that the results of inbreeding are not so harmful in some strains as in others. Investigators have shown that the immediate effect of close inbreeding is a marked decline in hatchability, that it increases chick mortality, and has a detrimental effect on the constitutional vigor and number of eggs produced.

Although there is no definite type or system of measurement by which we can select birds for laying with certainty, the first essential is the selection of those that have the characters wanted for egg production. It should be realized that the fundamental basis for selection is ancestry and constitutional vigor. A bird should appear bright, active, and healthy. It should be mature, well developed, of normal size, and have a vigorous constitution, giving evidence of ability to transmit similar qualities. The eye should be full, prominent and bright. The bird should have a good depth of body, with a long broad back and a straight breastbone. It should be tight in feather, free from any constitutional weaknesses and other abnormal faults, and be bred from a family of high egg producers.

The question of age of the breeding stock has received much consideration. The ideal mating is a fully matured cockerel with second season hens, the reason being that the male is then in his youthful prime and vigor, while the females presumably have been tested as pullets and are more likely to produce large chickens that will thrive well. Older breeding birds that have produced proved offspring should be treasured as the most valuable possession of the breeder.

The number of females that should be mated to one male is a question that cannot be answered off-hand, as much depends upon the

breed, upon the stamina and vigor of the male bird, and upon the conditions under which the birds are kept. With light breeds, the number of females to one male would vary from 8 to 16 or even 20, and with heavy breeds from 6 to 12.

Birds for breeding, should be reared under natural conditions, given as much free range as possible, and should be fed on a variety of plain wholesome meals properly balanced, succulent greenstuff, and clean grain.

# Spring Grafting

## Provision of Scions

*By F. J. Greatorex, Orchard Supervisor*

GROWERS who contemplate re-working obsolete varieties of apples and pears to more profitable ones, or who desire to provide for better pollination in their trees, must consider the provision of suitable scions. Scions for grafting deciduous trees can be collected during the pruning season, i.e., June, July, and August, while the trees are dormant, but the longer they remain on the trees the better, provided they are taken before growth commences.

For strap-grafting and pole-grafting select thin, but well-matured, annual growth, but for whip-tongue grafts slightly thicker wood should be collected. When gathered they should be stood up in the soil about 2 inches deep, close together, but not overcrowded, in a cool moist place. Too much moisture will cause rotting. Scions can also be kept in a cool store, but need to be inspected occasionally, as they may wither slightly about October. If this does occur, they should be taken out and stood in a few inches of water until they revive.

Scions that have been heeled in for a long period may start to grow; if so, pull them up and leave them out of the ground for a few days, but take care to place them in the shade. This will retard the movement, and then they can be put in soil again. Scions that are picked up from the ground after pruning, are often slightly withered, but these can be revived by placing them in water for a few days. If scions are completely buried in ground they need attention. They may start to grow early, or they may become water-logged. Both these conditions cause failures in subsequent grafting.

Grafting wood should only be taken from trees that are true to type and variety, free from disease, and of good bearing strain.

*Re-working a pear pergola in a Tasmanian orchard.*

*Packing Chart for—*

# GRAPEFRUIT

*in the*

# Californian Export Case

**24 x 11½ x 11½ inches inside measurements, clear of the division**

*By Basil P. Krone, Chief Fruit Packing Instructor*

IN view of the possibility of grapefruit being exported from Victoria to Malta, New Zealand, or the East, it has been deemed advisable to publish this chart in order to maintain the standard in the presentation of Victorian grapefruit.

| Approx. Size. | Pack. | Layer. | Layers. | Total. | Remarks. |
|---|---|---|---|---|---|
| 3¼ | 3–2 | 3 x 3 | 5 | 150 | The smallest size for export |
| 3⅜ | 3–2 | 3 x 2 | 5 | 126 | |
| 3½ | 2–2 | 3 x 3 | 5 | 120 | Stylar ends face upwards. Pack more loosely than usual |
| 3⅝ | 2–2 | 4 x 3 | 4 | 112 | Frequently small 3½ |
| 3¾ | 2–2 | 3 x 3 | 4 | 96 | |
| 3⅞ | 2–2 | 3 x 2 | 4 | 80 | Sometimes small, 4 inches. Stylar ends face upwards |
| 4 | 2–2 | 3 x 2 | 4 | 80 | |
| | 2–2 | 2 x 2 | 5 | 80 | |
| 4⅛ | 2–1 | 3 x 3 | 4 | 72 | Where not indicated the fruit should be packed on its cheek to ensure efficient height in the case |
| 4¼ | 2–2 | 2 x 2 | 4 | 64 | |
| 4½ | 2–1 | 3 x 3 | 3 | 54 | |
| 4¾ | 2–1 | 3 x 2 | 3 | 46 | |
| 5 | 2–1 | 2 x 2 | 3 | 36 | |
| 5¼ | 2–1 | 2 x 1 | 3 | 28 | |

*Note:*—It will be noticed that while the counts are in rotation the layer counts are not so. This is caused by the stylar ends facing upwards in some of the packs.

The bulge should be two inches or even more above the top of the case at the centre, but not more than about an inch at each end.

The bulge is formed by loosening the pack slightly at each end of the bottom layer and "nesting" the fruit a little more deeply than the others in the larger spaces thus formed. The fruit is then gently pressed down at the ends of each layer, but not in the centre.

*Proven by Repeated Experiments—*

MAIZE FOR GREEN FEED AND POTATOES

Demand "AMMONIA"

Sow with 3 & 1 Super and AMMONIA

(4 cwt. per acre)

and Topdress MAIZE with a Further 1 cwt. of

SULPHATE OF AMMONIA

*Build with*

HARDIE'S "FIBROLITE"

ASBESTOS CEMENT SHEETS

**The ideal building material for Homesteads and Farm and Station Buildings of all types. Fire Retardant, White Ant Proof, Borer Proof, Weather Proof, IMPROVES WITH AGE!**

Unrivalled for external walls, interior walls, ceilings, and partitions. Easily and quickly fixed—any handy man can erect "FIBROLITE." Supplied in 44 stock sizes. No waste. Less labour.

*Write for sample, price list, and catalogue—FREE AND POST FREE!*

JAMES HARDIE & COY. PTY. LTD.

CNR. CITY ROAD AND CLARENDON STREET,
SOUTH MELBOURNE

**COMMONWEALTH FERTILISERS AND CHEMICALS LTD.**

Enquiries: 65 William St., Melbourne

Is a simple arrangement that multiplies the power at the handle 260 times—handy to use, easy to move, quickly rigged, and works in roughest country. Standard equipment pulls trees and stumps from 1½ acres without changing anchor. Many other time and labour-saving features. Catalogue with pleasure.

**TREWHELLA BROS. PTY. LTD., TRENTHAM**

*A country bacon factory, from which is obtained raw material for the manufacture of meat and bone meals.*

# Stock Foods Act

## Brands Registered for 1938

*By W. C. Robertson, Chemist.*

THE Stock Foods Act of 1928, as amended by the Act of 1936, renders it compulsory for every manufacturer or importer of any mixed, concentrated or prepared stock food, stock lick, or by-product to apply to the Director of Agriculture for its registration. The application must be made on or before the last day of February in each year.

Details are to be given of the raw materials from which the stock food, lick, or by-product is prepared, beside the usual trade particulars (i.e., name and address of manufacturer, &c.), and the application must also give a chemical analysis stating the minimum percentage of crude protein and crude fat, and the maximum percentage of crude fibre contained in the stock food or by-product, or in the case of a stock lick, the maximum percentage of salt with the minimum percentages of phosphoric acid, lime, magnesia, iron, iodine, or any other prescribed constituent. Certifying labels must be attached to all parcels or packages containing stock licks or stock foods of the above description, excepting bran and pollard, both of which are standardized annually. As all registrations of the latter must conform to the standard fixed, it is not necessary for the label to certify the quality, although a label showing the name of the manufacturer and weight of the parcel must be attached.

The legislation is framed to protect and assist the mixed farmer, grazier, stock breeder, dairyman, pig, and poultry farmer in the purchase of suitable foods for the successful and economical feeding of live stock. As the value of any stock food will depend largely upon its content of crude protein, fat, and fibre, the publication of the analyses of the brands registered will permit buyers to compare analyses and prices, and patronize those manufacturers whose products give the best value for the money. The published

list, it is hoped, will also promote healthy rivalry in the trade, and thereby raise the standard of quality.

It is expected that a system of inspection of the brands on the market, somewhat similar to that practised under the Fertilizers, Fungicides, and Agricultural Lime Acts, with the subsequent publication and review of the analysis of the samples collected, will tend to eliminate foods of low quality, and those manufacturers whose product does not comply with the Act as regards quality, will suffer from the adverse publicity, in addition to any penalty which may be inflicted by the courts of law. These remarks also apply to the sale of stock licks.

A study of the registrations for the year 1938, which are published in tabulated form in this issue, will provide interesting particulars for those who wish to improve their knowledge of the composition of the feeding stuffs (concentrates, mixed foods, and by-products) and stock licks which are on the Victorian market.

### *Stock Foods.*

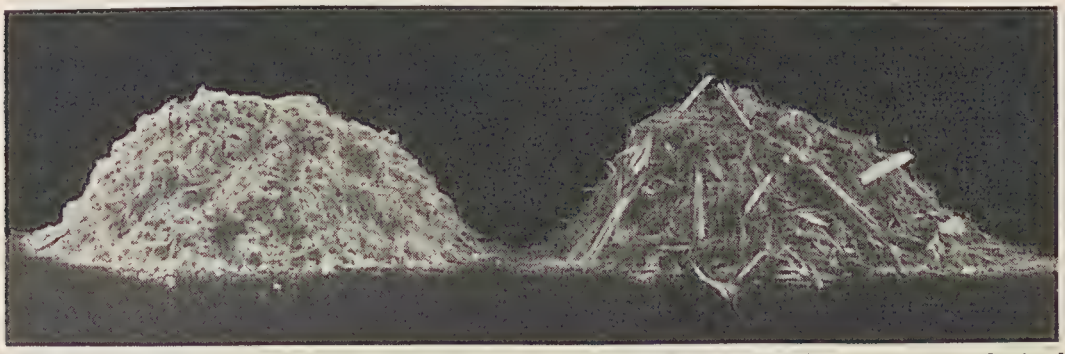
Distinguishing brand names, and analyses have been registered for 210 stock foods, comprising products from the grinding, cleaning, and milling of oats (15), barley (10), rice (5), maize (9), peas (8), and wheat—including bran and pollard —(60). Mixed foods (43), milk products (7), oilseed and cake meals (9), meat meals (23), blood meal (4), and miscellaneous products (10) make up the remainder. The figures in brackets represent the number of registrations under each heading.

The value of a stock food, apart from its palatability and digestibility, is dependent upon its chemical composition. Natural fodder consists of water, ash, crude protein, crude fat or oil, crude fibre, and the nitrogen-free extract which for the purpose of this article is termed carbohydrates (starch and sugars). The moisture and fibre may be regarded as structural necessities. The ash or mineral matter provides the essentials for bone formation and for medicinal purposes, and any deficiency in this respect under certain conditions, will be reflected in the subsequent feeding. Crude protein, crude fat or oil, and the carbohydrates are the chemical compounds which supply the bulk of the food units in any feeding stuff. Protein is the most valuable and therefore, the dearest. Crude fibre is the least important because of its indigestibility.

In cases where there is a deficiency in the supply of natural food or where economical considerations require it, the farmer resorts to feeding with a blend of roughage and concentrate, roughage being a high-fibre low-nutrient fodder, while a concentrate is a low-fibre high-nutrient product. In some cases the objective is a maintenance ration, in others enhanced production.

To calculate any requisite ration the percentage composition of the nutrients present in the foodstuffs available is necessary, hence the value of the list of registered stock foods. It will be readily understood that the percentage figures portrayed should represent a true and accurate analysis of the foodstuff which is sold. This is

*A tallow room at a meat meal works, where the greater part of the fat is extracted from the cooked meat prior to grinding it into meat or bone meal.*



*Showing the disparity in quality of "oat brannings" on the market. Both samples were obtained from parcels of stock food sold at the same price per ton. The sample on the right contains a very high percentage of crude fibre.*

of the utmost importance. It should be remembered that the digestibility of the nutrients plays a part, and when available, this should receive consideration.

Space does not permit a full review of all the stock foods in the list, suffice it to say that the analyses associated with some of the registrations are not what would be expected from their name or origin, and the food value of some by-products requires discussion and will receive attention in future.

## Meat Meal.

All the registered brands of this product, with two exceptions, have been described by manufacturers as meat meals, and consequently have been placed under this heading. Pure rendered meat meal contains approximately 4 *per cent of ash or mineral matter*, with a fat figure varying from 3 per cent. upwards, depending on the nature of the raw material and its condition, and the efficiency of the fat extraction. The protein content will approximate 70 per cent. on a 10 per cent. moisture basis. The average analysis of the 23 meat meals which are registered is :—

| Crude Protein. | Crude Fat. | Crude Fibre. |
|---|---|---|
| % | % | % |
| 52·1 (40–68) | 10·66 (5–18) | 2·0 (0–5) |

The figures in brackets represent the approximate range in the percentages guaranteed.

Calculating from these figures the average ash content must approximate 30 per cent. and it would appear that the majority of the meals registered are really meat and bone meals, the protein content varying with the amount of bone which is present. While the value of a meat, or meat and bone, meal will depend mainly on its protein figure, any excess of oil or fat will depreciate its value apart altogether from reducing the protein percentage, because of its tendency to reduce the digestibility of the protein.

The following analyses and prices per ton of the meat and bone meals on the London market will serve to illustrate the variation in value caused by high fat and ash figures :—

| Meat and Bone Meal. | Protein. | Fat. | Ash. | Price per Ton. |
|---|---|---|---|---|
| | % | % | % | £ s. d. |
| A .. | 60 | 3 | 15 | 12 10 0 |
| B .. | 50 | 3 | 21 | 11 0 0 |
| C .. | 45 | 4 | 25 | 10 0 0 |
| D .. | 40 | 4 | 30 | 9 10 0 |
| E .. | 40 | 10 | Not stated but probably 30 | 8 17 6 |
| F .. | 52 | 11 | Not stated but probably 20 | 10 10 0 |

Providing meat and bone meal is made from fresh, raw material which is free from skin, hair, and wool, or other foreign fibre, and that it has the pleasing odour of dried cooked meat, without an abnormal content of fat, it is indubitably a good concentrate of great importance.

Meat, or meat and bone, meal is manufactured in Victoria mainly by the dry-rendering process which consists of cooking fresh meat and bone refuse, and subsequently pressing the "cook" at high pressure whereby the greater part of the fat is eliminated. The pressed cake is then ground

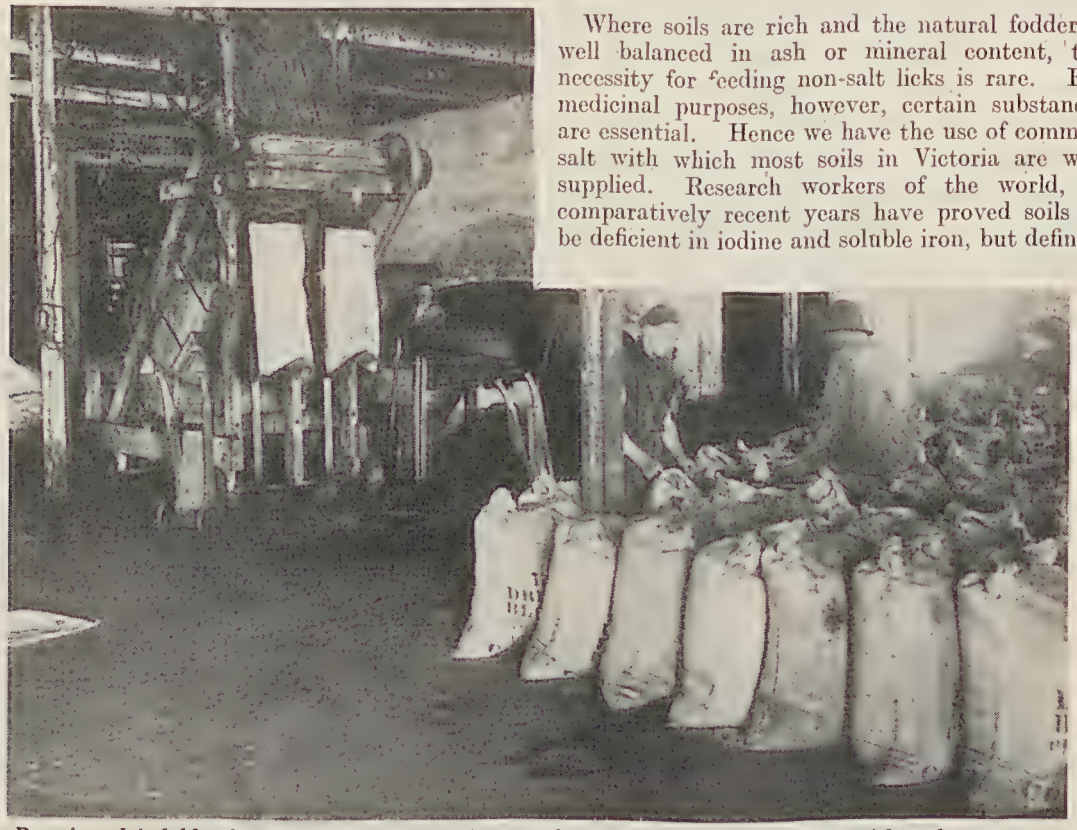
to powder and is ready for use. The presence of bone in the raw material is most advantageous in extracting the fat. As mineral matter of organic origin (bone) is probably better from the feeding standpoint than the artificial product, the presence of reasonable amounts of bone in a meal is an advantage, but the price per ton must depreciate with an increased bone or ash content because the mineral cannot be regarded as of equal value to the protein which it displaces. Section 15 of the Act permits the standardization of any stock food and, as the ash and oil contents of a concentrate are of supreme importance, it may be found expedient in the near future to fix standards for the varying grades of meat, and meat and bone meals so that the manufacturer of mixed foods, or the farmer who wishes to calculate a ration, may be sure of their figures.

### *Stock Licks.*

Where there is a mineral deficiency in the soil the fodder produced thereon tends to show a like deficiency. When this fodder is grazed or fed, symptoms of mineral deficiency and the associated ailments appear in the live stock of the farm. The best method of countering mineral deficiency in feeding stuffs is to use artificial fertilizers with the crop grown or to top-dress the pasture. The common deficiency in Victorian soils is phosphorus; thus top-dressing with a phosphorus fertilizer, such as superphosphate, will remedy the phosphorus deficiency of both the soil and fodder. Soil ameliorators, for example, agricultural lime or dolomitic limestone, will improve the lime, and, in the latter case, magnesia contents of the soil and counter these deficiencies in the pasture.

It may be said that superphosphate will supply lime in the case of lime deficiency. This is a debatable point because of phosphate reversion and the quantity of lime supplied per acre, although it is admitted that some of the lime of a superphosphate dressing or application does find its way into the crop or pasture produced from a lime deficient soil. In this case superphosphate should be regarded as a deterrent rather than a cure.

Where soils are rich and the natural fodder is well balanced in ash or mineral content, the necessity for feeding non-salt licks is rare. For medicinal purposes, however, certain substances are essential. Hence we have the use of common salt with which most soils in Victoria are well supplied. Research workers of the world, in comparatively recent years have proved soils to be deficient in iodine and soluble iron, but definite



*Bagging dried blood at a provincial freezing works. Large quantities of dried blood are manufactured in Victoria for use as a concentrate in the poultry industry.*

proof of these deficiencies in Victorian soils, fodders and pastures is not available and, therefore, their value in a lick is problematical and should be regarded rather from the tonic or medicinal viewpoint.

From the foregoing it will be gleaned that the main essentials of a safe and useful lick are available phosphates and lime, with or without salt and supplemented with substances having medicinal or tonic properties such as epsom salts, available iron, sulphur, and iodine. The lime and phosphorus are best supplied in the form of available phosphates of calcium, either as the chemical di-calcic phosphate or as the animal phosphates bone meal and bone flour. Di-calcic phosphate is more highly concentrated in phosphorus than bone meal, but it is devoid of food nutrients, whereas bone meal supplies appreciable amounts of protein and a small percentage of fat, which makes it a dual purpose lick, i.e., a mineral food and a fodder.

Bone flour, which is a by-product from the manufacture of gelatine, contains more phosphorus and lime than bone meal at the expense of the food value (protein and fat) which is practically negligible. Ground rock phosphate, owing to its insolubility, is often not regarded as suitable for incorporation in stock licks, although there is some evidence to the contrary while superphosphate, due to the calcium sulphate present, and to its acidity and high water soluble content, does more harm than good when fed to stock.

The 79 stock licks registered, details of which appear in the accompanying list, are subdivided into three sections, viz., common salt, bone meal, and miscellaneous. The six brands of stock salt require little comment further than to say the brands registered are, with one exception, approximately 100 per cent. pure. The bone meals, which are eight in number, are all of high quality.

In the case of the 65 registrations, under the heading of "miscellaneous," there are some compound licks with analytical figures which require careful consideration and comparison by the farmer before he decides to purchase. In many instances in recent years it has been found that the commercial valuation of some stock licks leans too heavily upon the doubtful value of their tonic or medicinal properties.

In conclusion, it must not be assumed that the registration of a stock food or lick is a departmental recommendation for its use.

***The registered list of stock foods and stock licks has been printed as a supplement to this issue.***

# Book Review

## *Tobacco Intelligence—Imperial Economic Committee*

*TOBACCO Intelligence*, the first number of which has just been issued by the Imperial Economic Committee, is a quarterly publication designed to supply a regular service of information on tobacco production, consumption, and trade.

In 1937, over 182 million pounds of tobacco went into the cigarettes, pipe tobacco, cigars, &c., manufactured in the United Kingdom and Empire tobacco accounted for 24 per cent. of this total. Growers in India, Canada, Southern Rhodesia, and Nyasaland, supplying most of this Empire tobacco, want to know how their competitors, Empire and foreign, are faring. *Tobacco Intelligence*, therefore, provides news about the crops in India, Canada, Southern Rhodesia, Nyasaland, and the United States, and the export movement of tobacco from these countries.

Consumption in the United Kingdom is fully analysed. A special article shows that 1937 was in almost every respect a record year for the country's tobacco trade. The progress made by Empire growers in the United Kingdom market should give them satisfaction. The use of Empire leaf for home consumption last year was considerably larger than ever before, both quantitatively and as a percentage of the total consumption. The position of Empire tobacco was well maintained in the first quarter of 1938.

Short articles include a description of the effect of the Agricultural Adjustment Act on the United States tobacco industry, and the adoption of auction sales for the disposal of tobacco in Nyasaland.

A specimen copy of *Tobacco Intelligence* may be obtained gratis by producers, merchants, and manufacturers on application to the Imperial Economic Committee, 2, Queen Anne's Gate Buildings, London, S.W.1.

# Tobacco Seed Beds

## Preservation of Covers

*By W. J. B. McDonald, B.Agr.Sc., Senior Plant Investigation Officer*

IN the original seed-beds, established by the Victorian Department of Agriculture to test the efficacy of the benzol treatment as a preventive of Blue Mould or Downy Mildew in tobacco seed beds, the calico covers used to protect the framed beds were treated with linseed oil. The linseed oil treatment was expected to render the covers more waterproof, and at the same time more permeable to light. It soon became evident, however, that this treatment made the covers very brittle, restricting their usefulness to one season, and in addition, the oiled calico provided an excellent medium for the growth of grey or dirty coloured moulds which made the covers very opaque. As a fair degree of light is necessary for the germination and satisfactory growth of tobacco seed, this fungal growth greatly detracted from the efficiency of the cover. In order to prevent, if possible, this mould growth on covers, which in some other states is considerably more rapid than in Victoria, endeavours were made, particularly by the Departments of Agriculture in Western Australia and Queensland, and by the Council for Scientific and Industrial Research, to develop a satisfactory calico treatment. A summary of the dressings tested and recommended by these various bodies is furnished herewith.

The Western Australian Department (1) recommends to its growers a paraffin wax treatment, which is reported to give good results, although when a somewhat similar formula was tested at Eurobin and in Queensland, a loss of strength and some susceptibility to the development of mould spots (on the cover) was reported. The materials required are as follows:—

12 lb. paraffin, 125°–130° C.
1 lb. clear petroleum jelly.
1 pint boiled linseed oil.
2 gallons mineral turpentine.

Break the paraffin into small pieces and melt it over a low flame with the petroleum jelly. Do not overheat as the material is inflammable. Mix the linseed oil and turpentine, and add slowly to the hot mixture, stirring continually. Draw the cover slowly through the hot mixture to saturate the calico, then squeeze out excess liquid and hang out to dry.

It is suggested that the above should be sufficient for about 60 square yards of fairly good quality calico. As some shrinkage occurs in treatment a loss in length of about one in thirty should be provided for.

### *Alum-Lead Acetate.*

Treatments with alum-lead acetate or Shirlan AG (2) are regarded by the Queensland Department as being most worthy of recommendation, although Neill, New Zealand (3), working on deterioration of tent calico, reports that aluminium lead acetate failed to protect, and injured the fabric. This method is fairly cheap, but cumbersome to operate.

The formula for this treatment, recommended by the Queensland Department, is as follows (2):—Two solutions are necessary, one of alum and another of commercial lead acetate. The method of preparing 5 gallons of each and the procedure entailed is as follows:—(1) Place 1 lb. alum in 1 gallon of boiling water and stir until dissolved, add this solution to 4 gallons of water making 5 gallons in all. Soak the calico in the alum solution for one day, kneading it well so as to ensure thorough wetting and to remove the sizing material from the cloth.

(2) Stir ½ lb. lead acetate in 1 gallon of boiling water until dissolved. Add this solution to 4 gallons of cold water, making a total of 5 gallons as before. After the expiration of the required time, remove the material from the alum solution and wring lightly. Then soak it in the lead acetate solution for from five to six hours, remove, wring lightly, and allow to dry.

If it is desired to add some slight waterproofing property to this dressing, ¼ lb. of glue size or gelatin may be dissolved in a small quantity of water heated for the purpose and added to the lead acetate solution.

The cost of materials used in making up the two solutions should not exceed approximately 1s. 6d.

### *Shirlan Treatments.*

In the opinion of the writer the chemical substance, known as Shirlan, first developed and used in England as a specific protection for cotton and woollen fabrics is likely to prove the most useful dressing at present available for tobacco seed bed covers, despite its initial high cost. Neill, in New Zealand, has reported the water soluble form Shirlan WS to give good protection to tent calico, to be simple in application, and relatively cheap, while Mandelson, in Queensland, reports that Shirlan AG, the insoluble form is sufficiently satisfactory when all aspects are considered, to warrant its recommendation.

Since Victorian conditions are not as favorable to mould development as are Queensland conditions, Shirlan AG should prove quite satisfactory here. Shirlan AG should be obtainable from Imperial Chemical Industries Ltd., at approximately 4s. 6d. per lb., while Shirlan WS is priced at a somewhat higher figure.

To treat calico with Shirlan AG it is recommended that this material be added to the required amount of water at the rate of 1 per cent. by weight, that is 1 lb. of Shirlan AG to 10 gallons of water. The calico should be soaked in the solution for half an hour or more and thoroughly kneaded to ensure proper wetting of the fabric. After soaking for a sufficient length of time it should be spread out sufficiently well to allow to dry properly.

Neill's recommendation for the treatment of calico, with the water soluble form, Shirlan WS, is as follows:—The calico should be soaked for one hour in a solution made up by dissolving 1½ oz. of Shirlan WS to each gallon of water. The calico should be covered with the solution, loosely folded and moved about during the dip so that every part becomes evenly saturated. After removing from the dip the calico should be hung out to dry without wringing, ensuring as far as possible that all parts dry evenly.

Growers are reminded that the above treatments are designed mainly to protect calico from attacks by moulds (not blue mould), which may cause it to deteriorate in general character and spoil its colour. Neither of the Shirlan or alum-lead acetate treatments add any waterproof character to the canvas, although the paraffin wax treatment is effective in this regard. In districts outside the North-East, seed bed covers should serve satisfactorily for at least two years without any treatment whatsoever, provided reasonable care be given them.

Mould development on covers is caused mainly by rolling them up in a damp condition. Where seed beds have been established in close proximity one to the other, there is little room available for drying the covers after the beds are uncovered. It is suggested that those growers who contemplate establishing a new series of seed beds, should leave about 6 feet space between beds, so that damp covers can be laid out on some type of light temporary frame to dry. At the end of the season all covers should be carefully dried, and stored in a dry condition.

In the North-Eastern district it is expected that an annual treatment with Shirlan AG or WS, should preserve seed bed covers so that they could be satisfactory for at least two and possibly three years.

#### *References.*

1. Sharp, A.—"Tobacco Seed Bed Covers." Jour. Dept. Agric., W.A., XIII., 4, p. 503–507, 1936.
2. Simmonds, T. H., and Mandelson, L. F.—"The Treatment of Tobacco Seed Bed Covers to Prolong their Useful Life." Queensland Agric. Jour., XLVIII., 2, p. 112–115, 1937.
3. Neill, J. C., and Travers, E.—"Prevention of Deterioration of Tent Calico." N.Z. Jour. Sci. and Tech., XIX, 10, p. 646–651, 1938.

*By A. W. Jessep, M.Agr.Sc., B.Sc., Dip. Ed., Principal School of Horticulture, Burnley*

### *The Flower Garden.*

MID-WINTER is often looked upon as a slack period in the garden, but it is the time for making any necessary alterations and renovations. Pergolas may need painting, drainage may need attention; shrubs should be shifted if necessary or perhaps new ones put in; if so, this is the time for all such work.

Preparations should be commenced now for the spring- and summer-flowering annuals, and the seeds of Antirrhinums, Carnations, Dianthus, Stocks, Gaillardias, Scabious, Geums, Larkspurs, Sweet Peas, and Wallflowers should be planted. This is a good month for planting such deciduous trees as Oaks, Liquid ambers, Maples, flowering fruit-trees, and for berry fruits.

Most of the Conifers are seen at their best during the winter months. To select the most desired specimens pay a visit to a nursery and see the young plants growing; then select according to your requirements. Unlike many other trees and shrubs, the Conifers will do very well in both the highlands and lowlands. One of the essentials in growing Conifers is to plant them in the open, away from fences or walls, so that they will obtain plenty of light to enable them to develop symmetrically; if one part receives insufficient light that part will be stunted in growth. The beauty of these plants lies in their symmetrical shape and graceful habit; they can be recommended also for their hardiness under a wide range of conditions. There are Conifers to suit most conditions; they grow from a foot or two in height to huge trees, and in shape from upright to very spreading. The colour of the foliage may vary from almost blue to green, yellow, or autumn tints. There is a Conifer for every purpose, e.g., they may be grown in rockeries, tubs, or pots, as shrubs, or as large specimen trees.

Some of the most popular of the Conifers are:—

1. Cryptomeria, the Japanese Cedar. The one usually grown is *Cryptomeria Japonica elegans*; it has soft, downy foliage which changes to bronze-red in winter. There are other types which differ by not changing the colour of the foliage, or by being dwarfed in habit. Crytomeria thrive best in a fairly moist soil.

# CANVAS AND HESSIAN FOR TOBACCO GROWERS

**Be Sure of Satisfaction . . . Use No other than "THOMAS EVANS'"**

**NEW CATALOGUE**

1938 edition now ready. 32 pages of Canvas Goods.

Free to all inquirers. If Thomas Evans' Goods are unprocurable locally, write us direct.

There's double protection in THOMAS EVANS' Canvas and Hessian, that's why they have "Double Life." Only the best makes are in stock, including the world-famous "BIRKMYRES" Waterproof Canvas. Renowned for durability and dependability; spun and woven stronger from highest-grade materials; most attractive values; backed by Thomas Evans' 85 years' experience in producing Canvas Goods

**Secure full Particulars. Obtain Prices and Estimates on your needs**

THOMAS EVANS
— PTY LTD —
415 BOURKE ST MELBNE.

# SAVING BY SYSTEM

TO men whose pay-day comes regularly, saving is comparatively easy. To others whose income is seasonal, saving is harder—but the necessity for it more acute.

The "lean periods" of the year must be provided for; and the best way to do it is in advance by means of planned deposits in the—

# STATE SAVINGS BANK of VICTORIA

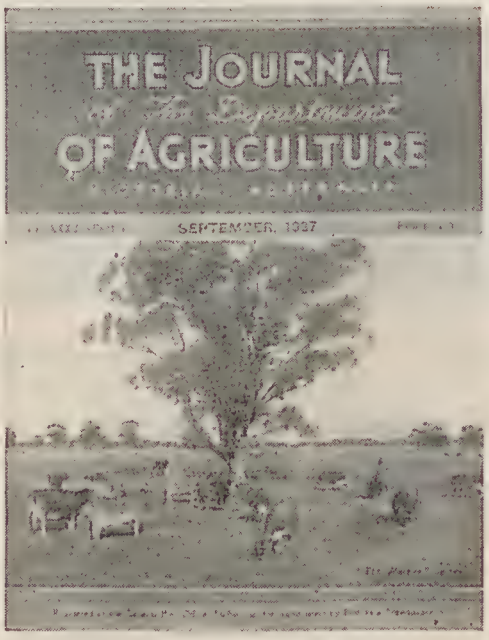
*Head Office, Elizabeth Street, Melbourne.*

J. THORNTON JONES, General Manager.

# The Journal of Agriculture

OFFERS EXCEPTIONAL ADVANTAGES

## *for* ADVERTISING




THE JOURNAL OF AGRICULTURE circulates widely throughout the country districts of Victoria and amongst farmers of the Commonwealth, reaching also country bankers, professional and business men, school teachers, &c. It offers exceptional advantages for the advertising of all goods required by the farmer and in the rural home

Only advertisements approved by the Department are accepted for publication in the *Journal*

The *Journal of Agriculture*—the Official Journal of the Department of Agriculture of Victoria—is published monthly and has a GUARANTEED CIRCULATION of

## 10,000 COPIES MONTHLY

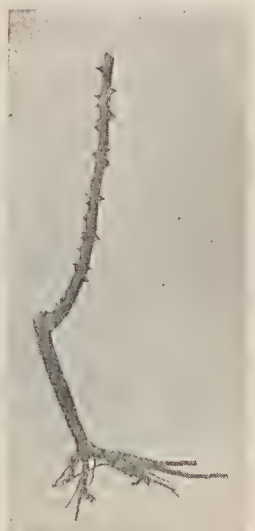
**Advertising Rates on Application to the Director, Dept. of Agriculture, Melb., C.2**

2. Retinospora. These are mainly dwarf types of Conifers which are particularly useful as tub plants or small specimen trees. *R. leptoclada* is very popular and is a beautiful, slender-branched variety of upright growth with blue-green foliage. It makes a very good specimen small tree. *R. plumosa* is a very hardy variety; its foliage is brown-green in colour; it grows to a height of 8 to 12 feet.
3. Thuya or Biotas. These vary from a foot or so in height to medium sized trees, and can be used as tub plants, on the rockery, or as specimen garden subjects. *T. occidentalis* is a hardy conifer and makes a good specimen shrub. The variety compacta is a dwarf type suitable for a rockery or pot plant. There are several varieties and colour variations.

Of the larger Conifers which make good specimen trees, but which need plenty of room for their development, a selection may be made from the following:—*Sequoia* (Californian Redwood), *Agathis* (the Kauri), *Cedrus* (the Cedar), *Abies* (the Firs), *Picia* (the Spruce), and *Cupressus* (the Cypress).

*The roots and head of a new rose bush should be pruned before planting.*

Last month a selection of roses was given, and now is the time to plant them. They should be kept in water for a few hours before planting. The roots must be trimmed and any damaged portions removed, and the head cut back to a good strong eye. (See illustration.) When planting make a hole about 2 feet in diameter and then raise it in the centre. Place the young plant at the same depth in the ground as it was in the nursery, and put a stake in the centre to which it will be tied. On the raised portion spread the roots and turn them downwards. Half-fill in the hole and firm the soil with the foot. Then pour water up to the brim, and when the water has disappeared fill the hole with soil and tie the rose to the stake. Do not use any manure when planting. If just previously roses have been growing in the area, replace the soil from the hole with soil in which roses have not been grown; if possible, from a virgin source.



*The bush, shown in the previous illustration, after correct pruning.*

After pruning the established roses they should be sprayed with lime-sulphur 1 in 10 to check fungus diseases and aphis. Then clean up the beds and give them a light forking over.

## *Vegetables.*

As next month is the time to sow the main vegetable crops, the work of preparing the seed-beds should be carried out now. Vegetables respond to careful soil preparation, and if any leaves or stable manure are available, these should be very well worked into the ground.

Further sowings of broad beans and peas may be made, and it is not too late to transplant herbs, rhubarb, garlic, onions, and shallots. Also make a small sowing of lettuce and potatoes.

The soil between the rows where the vegetables are growing should be given a good forking, and cabbages and cauliflowers and such plants hilled up. This not only stimulates root action and encourages growth, but holds the roots more firmly in the ground during windy weather.

July is the month in which to sow the main crops of peas. There is no more popular vegetable; it is fairly easy to grow, and if

carefully looked after, will have a long cropping period. They are at their best in a good friable soil, particularly that in which a crop of potatoes has immediately preceded. The area should be dug over and a good dressing of farmyard manure well worked into it. Plant in double rows 2 inches apart with about 2 inches between the seeds in the rows. There should be from 24 to 30 inches between the double rows so that they can be cultivated readily, and the pods picked without injury to the plants. When sowing, add a light dressing of lime, as peas respond well to lime. When the plants are about 6 inches above the ground, draw the soil towards them and give a dressing of equal parts of sulphate of potash and superphosphate at the rate of ¼ lb. per 8 yards of row.

For the May–June sowing it is best to use an early variety, such as William Hirst and English Wonder, but during July and onwards, Green feast, Stratagem, and Yorkshire Hero give larger pods, and they withstand the warm weather better. From the time of sowing until the pods are ready for picking there is an interval of from 2½ to 3 months.

Plantings of strawberries, loganberries, currants, gooseberries, and grape vines should be carried out before the end of this month.

# Orchard Notes

*By J. L. Provan, B.Agr.Sc., Senior Horticultural Instructor.*

During July, pruning, the application of dormant sprays and orchard sanitation will be the chief activities in the orchard. Planting of young trees should be completed before the end of the month in order that they may be well-established before root growth commences.

Last season, red spider was very troublesome on apples, pears, prunes, plums and almonds. Where this pest occurred, an examination around the leaf buds and fruit spurs will reveal large numbers of eggs. To destroy these eggs, spray thoroughly with lime sulphur 1 in 10, paying particular attention to the underside of spurs and laterals. Where San José, brown or black scale is present in addition to the red spider, a combined spray of 2 gallons of winter white oil, and 5 gallons of lime sulphur made up to 80 gallons with water, will be found very effective.

The application of tar distillate sprays, for the control of green peach aphid, should be completed before the third week of this month. If applied later than July, damage to the developing buds will result. The eggs of the green peach aphid are hidden behind the buds and are readily destroyed by a thorough spray application of 3 : 100 tar distillate. Headlands and channel banks should be cleaned of weeds, &c., which might act as hosts for the insect. Growers who intend to use this spray for the first time are warned about its effect on the skin. Goggles should be worn to protect the eyes, and castor oil spread over the exposed skin.

Do not rely on summer cover sprays to completely control brown rot of apricots, peaches, plums and cherries. The control of this disease should commence now with the collection and burning of all mummified fruits and diseased twigs on the trees. Some of the mummified fruits may have dropped to the soil already, and if these are left undisturbed they will provide a source of infection. To overcome this the small strips of land between and around the tree trunks should be well cultivated.

Orders for commercial fertilizers should be forwarded this month so that applications can be completed before the end of August. For early flowering trees such as the almond, nectarine, apricot, and some early blossoming peaches, the quick-acting type of fertilizer, e.g., sulphate of ammonia, should be applied and ploughed under by the end of July or the first week in August. Where slow-acting organic manures, e.g., blood, or blood and bone are favored, these should be applied about three weeks earlier. The setting of almonds and stone fruits is assisted by applications of readily available nitrogenous fertilizers.

Applications of sulphate of ammonia will vary from 2 to 5 lb. per tree depending on the soil and trees. If a form of blood manure is to be employed the equivalent amount of nitrogen should be studied and the application increased accordingly. A blood and bone fertilizer with a total nitrogen content of only 5 per cent. should be used at the rate of about 8 to 20 lb. per tree if it is desired to add approximately the same amount of nitrogen as in the above sulphate of ammonia applications. If dried blood fertilizer, with a nitrogen content of 12 per cent. is to be applied, the corresponding quantities will be 3½ lb. to 8⅓ lb. per tree. Some growers prefer to add portion of the nitrogen in a readily available

form and portion in a slow-acting form, and for this purpose, trees which normally would receive 4 lb. of sulphate of ammonia each, would receive a combined fertilizer of 2 lb. of sulphate of ammonia and $3\frac{1}{3}$ lb. of dried blood fertilizer (12 per cent. nitrogen).

Generally, it is better to apply the phosphoric acid requirements of the tree in the form of superphosphate than in the less available form of bone dust. The above remarks concerning the nitrogenous value of the fertilizer apply also to the complete fertilizers. For example, the 2.2.1 mixture contains only 8·24 per cent. nitrogen, and therefore to apply an amount of nitrogen equivalent to, say 4 lb. of sulphate of ammonia per tree, this 2.2.1 fertilizer should be applied at the rate of $9\frac{1}{2}$ lb. per tree.

*A quarter-mile breakwind of Brande's Jordan almond trees in full bloom.*

Passion fruit growers will be interested in a new, half-bushel case for local and interstate markets. The dimensions are 18″ x $5\frac{1}{4}$″ x $11\frac{1}{2}$″ and the various "packs" have been worked out in equal dozens, e.g., 15, 16, 17 dozen, and so on, per case. This development it is hoped will assist both the producer and the buyer. Copies of the chart will be available in the near future.

In the cooler and wetter apple districts of the State, growers have reported that in the early spring the parasite—*Aphelinus mali*—does not control woolly aphid sufficiently. Under these conditions the aphid causes damage to the trees. As the summer advances the parasite becomes more active and the control is better. In such areas growers are advised to adopt the winter spray program for the control of this pest. This consists of red oil 1 in 15.

Towards the end of this month the early blossoming almond varieties commence blooming. One of the first varieties to bloom is Brande's Jordan. This variety usually blooms so early that frosts and the absence of blooms of other varieties cause it to set poor crops. The setting of the majority of almond varieties is greatly improved if adequate provision is made for cross-pollination. In addition to providing varieties which bloom at the same time, hives of bees should be introduced into the orchards. To cross-pollinate Brande's Jordan—Early Papershell, Riverside Peerless, Chellaston, Ne Plus Ultra, or I.X.L. can be used. If these varieties are not planted in close proximity to Brande's Jordan, small limbs of blossom should be placed in a bottle of water in each tree. Another effective method is to graft, or bud, a limb near the top of the Brande's Jordan tree with one of the above varieties to provide a permanent source of pollen for cross-pollination purposes.

Orchard heating, by means of briquette or oil burners is becoming more popular amongst growers who are in frosty localities and who grow fruit trees and vines liable to frost injury. Growers interested in this subject are asked to write for further information.

Results of recent research work in the cool storage of plums and peaches have shown that many varieties of these fruits can be successfully stored for longer periods than was once thought possible. Some varieties of plums can be stored for a period of eleven weeks, while Lawford's Gage (probably synonymous with Cole's Golden Gage) can be held for sixteen weeks. Smith's, Catherine Ann, and Late Crawford peaches can be stored for two months. Further particulars of these storage results are contained in Instructional Circular No. 16 which is available free on application to the Director, Department of Agriculture, Melbourne, C.2.

# Degeneration Diseases of the Strawberry

## The Local Problem and a Review of the Present Knowledge of these Diseases

*By A. T. Pugsley, B.Agr.Sc., Assistant Plant Pathologist.*

THE degeneration diseases of the strawberry have become world wide in their distribution, and many workers in oversea countries have shown them to be a major cause of failure in strawberry plantings. At one stage there was a considerable amount of confusion as to the predominant cause of such degeneration, but, in the writer's opinion, the position was well summed up in 1935 by the following quotation (1) :—

> "There is, as far as we know, no ground whatever for believing that the general low level of health and vigour which has beset of late years our strawberry plantations is in any way due to the occasional attacks of this or that soil parasite . . . . Cultivation and propagation must rank at most as predisposing causes. There remains, therefore, virus disease and insect pests as the potential villains of the piece."

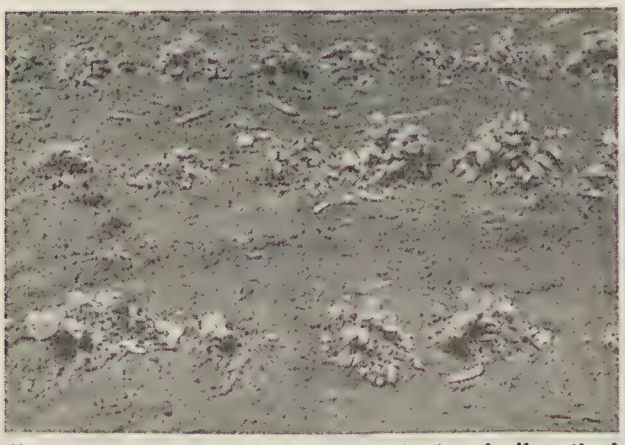


*Fig. 1.—A patch of Melba strawberries in a badly wilted condition. All these plants showed crinkle symptoms in the following autumn.*

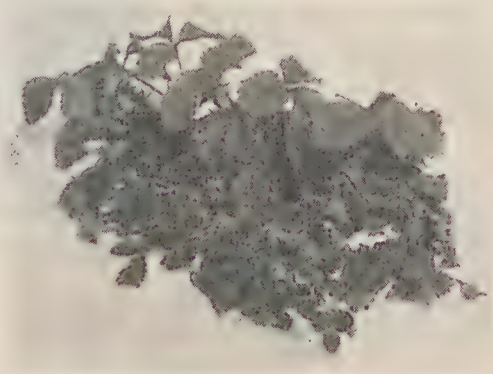


*Fig. 2—A typically wilted Melba plant. Note how the lower leaves and berries are withered.*

Although there is little doubt that the virus diseases of degeneration—Crinkle and Yellow Edge—have been present in Victoria for a number of years, they were not identified as such until the early part of 1936.

In November, 1935, the attention of the Victorian Department of Agriculture was directed to the Silvan district, where severe damage was being caused by a disease in plantings of the popular Melba variety.* At this time three properties which were considered to be typical of the district were inspected. The growers concerned stated that the plants had made fair growth during the previous season, but when the first of the 1935–36 crop should have been ready for harvesting, the plants showed a wilted appearance, the leaves were dry and shrivelled, and the berries withered (Figs. 1 and 2). In some plantings almost every plant showed some evidence of the disease. Although these general

* E. Meeking (J. Agric. Vic., 1914) states that our most widely grown Melba variety originated in New South Wales. It was raised by Mr. Horton, of Parramatta, where it was known locally as Horton's Seedling. In 1899 a Doncaster orchardist, Mr. F. Wilson, introduced it into Victoria. The characteristics of the berry were its deep red colour, its excellent flavour, its small core, and firmness of texture. It responded readily to irrigation, was a very prolific cropper, and soon became a favourite variety.

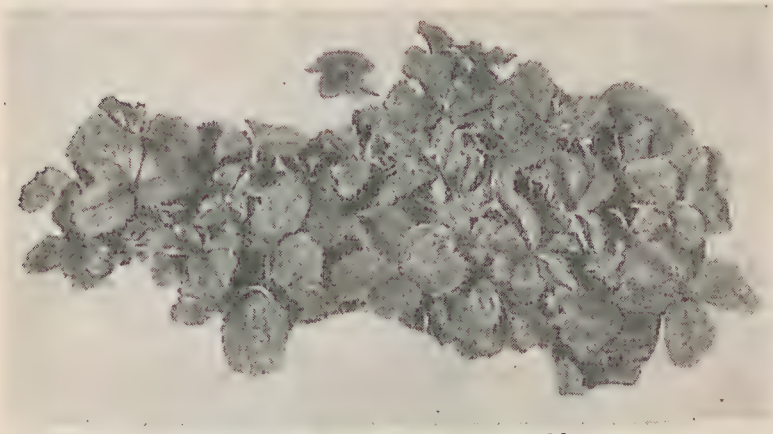


*Fig. 3.—Typical Melba plants showing crinkle symptoms.*

symptoms suggested a root trouble, examination of the roots of diseased plants did not support this hypothesis and, furthermore, attempts to isolate a causal organism from the roots always gave negative results.

An interesting observation was made on one property where a patch of two to three acres of Melbas appeared to be destroyed by the disease, except for a comparatively healthy portion which was directly overlying an underground drain. Another grower had planted a patch of virgin land with the Melba variety, portion with his own stock, and portion with stock obtained from a neighbour. His own stock had yielded badly diseased plants, while those from his neighbour presented a much better appearance. From this observation it would appear that the health of a new stand is dependent on the place of origin of the parent plants.

A further observation made at this time was that varieties differed in their susceptibility to the disease. Examination of beds of other varieties showed that Wilson's Pride (a local variety the origin of which is obscure), and an Ettersburg (89 ?) were much more resistant to the trouble than was Melba. Although beds of the Tardive de Leopold variety may show a high percentage of plants with crinkle symptoms there is not the same loss in vigour which occurs in the Melba variety. Although no decision could be arrived at as to the cause of the trouble, these first inspections indicated that **the disease was runner borne, that it was aggravated by poor drainage conditions, and that varieties differed in susceptibility.**

The true nature of the disease was evident when a second inspectional visit was made to the same district in March of the following year (1936). The plants which had almost died out in the early summer had recovered to the extent that they had produced a new crop of green leaves. However, the plants were by no means normal in appearance—the symptoms being very

*Fig. 4.—Healthy (left) and crinkled (right) strawberry leaves.*

typical of those diseases belonging to that large group—the virus diseases. The plants were slightly stunted and had a generally unthrifty appearance (Fig. 3). The young leaves were very crinkled with a pronounced mottle along the side veins (Fig. 4), and some of the leaves had small yellow to red pin-point areas scattered over the surface. **These symptoms are those of a typical plant, and it should be emphasized that less-typically diseased plants were very common, and in fact, it was frequently difficult to diagnose the doubtful cases with any certainty.**

Reference to literature showed that these symptoms were in close agreement with those of a disease described some years ago by Zeller and Vaughan, who named the malady Crinkle (2). Although this paper does not refer to a wilt stage of the disease, Zeller (12) in a detailed account of crinkle states that crinkle-infected plants were more readily winter killed than were crinkle-free plants.

In the following season the wilt stage of the disease was not so evident, although in the early summer of 1937 the wilting of plants was again fairly general. It would seem that the appearance of this phase of the disease is governed by certain environmental factors, which are at present not fully known. The crinkle symptoms were again common, but not so well defined, during the autumns of 1937 and 1938.

In the autumn of 1937 symptoms of a second degeneration disease resembling those of yellow edge (3) were observed in a plantation of Royal Sovereigns, although no evidence of this disease could be found on Melba plants which were growing alongside. In 1938, Royal Sovereigns were observed to be showing symptoms of both crinkle and yellow edge co-existing in the one plant (Figs. 6, 7, and 8).

The popular English Royal Sovereign variety is not grown commercially in Victoria, so that the yellow edge disease, at the moment, is of secondary importance to crinkle. However, when we consider that the failure of the Royal Sovereign under our local conditions is most likely due to the presence of the yellow edge virus in our stocks, and when we consider the potential danger of this virus to other strawberry varieties, it is perhaps desirable to include this disease in our present discussion. In any case, the principles

*Fig. 5.—A healthy Melba plant.*

underlying the control of each disease are essentially the same.

The symptom types which have been noted on the commonly grown Victorian varieties up to the present time are set out in Table 1. (A complete picture of the virus content of Victorian varieties can be obtained only by supplementing field surveys with greenhouse experiments where "indicator" plants are grafted to the plants under test.)

TABLE 1.—SYMPTOM TYPES NOTED ON VICTORIAN VARIETIES OF STRAWBERRIES.

| | |
|---|---|
| Melba .. .. | Crinkle only |
| Ettersburg (89 ?) .. | Crinkle and one doubtful case of yellow edge |
| Wilson's Pride .. | No well-defined symptoms yet observed |
| Tardive de Leopold .. | Crinkle and yellow edge |
| Royal Sovereign .. | Yellow edge and yellow edge plus crinkle in combination |

*Insect Vector.*—During the autumn of 1937 aphis collected from Melba plants at Silvan were identified by Dr. J. Davidson of the Waite Agricultural Research Institute, as *Capitophorus frageriae* (Theo.) which is generally regarded as synonymous with *Myzus fragaefolii* (Cockll.) and *Capitophorus fragaefolii* (Cockll.). This insect has been shown by oversea workers to be the vector for both crinkle and yellow edge. A note on the biology of the strawberry aphis is contained in a

paper by Hodson (14) who, however, questions the identity of the English and American forms.

Having determined the cause of deterioration of our strawberry varieties, we are able to survey the literature from other countries in our efforts to arrive at satisfactory measures for controlling these diseases.

### *Crinkle Disease.*

The crinkle disease was first observed in one or two of the western states of the United States of America in 1925, and was reported upon by Zeller and Schuster in 1926 (4). In 1934 Ogilvie *et al.* reported its occurrence in Great Britain (5).

In Victoria the crinkle symptoms on the Melba variety are very similar to those described by Zeller (12) as follows:—The most characteristic symptoms are the crinkled condition and yellowish areas of the leaves. The primary symptoms which show up about two weeks after the plants are infected are extremely localized, starting in small developing leaves as mere pin-point areas. These spots enlarge slightly, and may become reddened or necrotic. Besides this stippling or pin-point mottling, some leaflets exhibit most uneven chlorosis. This is especially true in advanced stages of crinkle—the yellowing extending in streaks along a few veins toward the mid-vein. During any season of the year a mature plant affected with crinkle is a lighter shade of green than normally. The leaves have short petioles, giving the plants a flattened appearance.

It is interesting to note Zeller's report that plants sometimes tend to grow out of the trouble. Reference is also made to a temporary masking of these symptoms in commercial plantings. He states that the temporary masking or failure of symptoms to appear is a type of behaviour which occurs especially in the better strawberry soils, and that in plantings less than one year old, one cannot be sure to recognize the disease. These points thus have a very practical bearing on the selection of planting stock in the late autumn.

In the United States the control of crinkle has been demonstrated following upon the selection of healthy plants and their certification as to freedom from disease. Zeller and Vaughan (2) quote a reference by Hunter, stating—

> "*State Certification of Strawberry Plants.*—The practicability of selection and roguing to eliminate crinkle from the Marshall variety has been demonstrated, and has led to the certification of strawberry plants in the State of Washington. In the selection of plants and roguing for this certified stock, the purpose was to eliminate all abnormal plants."

It is perhaps desirable to stress the remaining portion of the quotation—

> "Doubtless, where very high percentages of the disease exist, fields should be abandoned as sources of planting stock, but selection of normal plants could be advised in fields containing 10 to 20 per cent. of crinkle, while roguing is practicable only in cases of less than about 5 per cent."

These methods have been applied in a similar way in Oregon and Minnesota, where, following upon selection and roguing, several plantings have been certified as free from the disease.

*Fig. 6.—A Royal Sovereign plant which showed symptoms of both crinkle and yellow edge.*

### *Yellow Edge.*

The strawberry yellow edge disease, first noted in England in 1930, was described by Harris in 1933 (3). In 1934 Howells (6) states that yellow edge became fairly well established in Scottish strawberry plantations, where most of the infections were traceable to imported English material. Diseases closely resembling yellow edge have been reported from Canada (7), New Zealand (8), and Tasmania (9). In a recent report Harris and Hildebrand (15), in making a comparative study of the degeneration diseases of English and Canadian varieties, have demonstrated the close

similarity existing between yellow edge disease in England and the analogous disease in Ontario. They point out that, as regards yellow edge, any difference between the symptomatological pictures in both countries is related primarily to differences inherent in the varieties grown, rather than to wide differences between the pathogens or the environmental conditions of cultivation. In the United States of America

*Fig. 7.—Crinkle symptoms on leaf of plant shown in Fig. 6.*

a disease—Yellows or Xanthosis—is believed to be identical with yellow edge, according to recent reports by Harris of East Malling (10). Yellows or Xanthosis was first reported in 1922, and was fully described by Plakidas in 1927 (11).

The following symptoms of yellow edge are those described by Harris, who points out that it is important to remember that under English conditions the diagnostic leaf symptoms have been completely manifested only from the middle of September to the end of October (i.e., in Australia from mid-March to end of April). The symptoms on the leaves consist of a yellowing of the marginal region accompanied by (*a*) a general dwarfing, (*b*) an irregular curling of the marginal region, (*c*) a downward curling of the midrib, and (*d*) a twisting of the whole lamina. In general appearance the plant is abnormally "flat," being composed of a zone of more or less normal outer leaves, enclosing a central zone of dwarf "yellow edge" leaves.

In regard to the control of yellow edge, Harris (10) of East Malling, in dealing with the question of the "*Maintenance of reliable supplies of virus-free runners*," states that the outstanding success of certain growers in maintaining the vigour of their "strains" of such susceptibles as Royal Sovereign has depended to a large extent on their intuitive elimination of virus plants from their runner beds. Further, as the efficacy of roguing for maintaining supplies of yellow edge free runners depends on the relation between infection and the appearance of clearly visible diagnostic symptoms, it is well to remember the factors which may cause the masking of yellow edge symptoms. These are—

(1) *Seasonal and Weather Conditions.*—Symptom expression is encouraged by cool, moist conditions, and is masked in hot, dry weather.

(2) *Age of the Infected Plant.*—It is found that roguings are more likely to be effective on a two-year old bed than on a maiden runner bed.

(3) *Soil Conditions.*—The symptoms were found to be more prominent on diseased plants growing in poor soil.

### *Resistant Varieties.*

As with all diseases, the use of resistant varieties is perhaps the best way in which to overcome loss. This applies particularly to strawberries which are vegetatively propagated so that the difficulty of obtaining and fixing pure lines is not encountered. Zeller (12) reports that the United States Department of Agriculture, in co-operation with the Oregon Agricultural Experimental Station at Corvallis, is breeding new varieties of strawberries in order to obtain, not only desirable sorts for particular uses, but also varieties which may possess resistance or immunity to the crinkle disease.

*Fig. 8.—Yellow edge symptoms on leaf of plant shown in Fig. 6.*

Harris (10), in testing out the relative susceptibility of the forest species of the strawberry *F. virginiana* and *F. chiloensis*, found that the former was very susceptible to yellow edge, while the latter was highly resistant. Of the cultivated varieties tested, Royal Sovereign and Sir Joseph

Paxton were highly susceptible, while Lefebvre, although not immune, was very resistant. Harris and Hildebrand (15) have shown that Parson's Beauty, Premier (Howard 17), and Glen Mary to be symptomless carriers of yellow edge, while Lefebvre and Oberschlesien were reported to possess a comparable resistance. Regarding xanthosis, Plakidas (11) states that the following varieties have thus far shown a rather high degree of resistance :—Early Ozark, Howard 17, Dr. Burrill, Dunlap, Premier, Parsons, Campbells Early, August Luther, and Americus. In reference to the resistance of Etter's varieties to xanthosis he remarks that "As all of Etter's varieties contain, to a smaller or greater degree, the *chiloensis* blood, they owe perhaps their high resistance to their wild parent." He also reports that the wild species, the wood strawberry *F. californica* C. and S. is apparently susceptible to xanthosis. G. M. Darrow (13), in an interesting article on "Strawberry Improvement," refers to Redheart, Rockhill, and *F. chiloensis* hybrids in Oregon as being resistant to crinkle; and Nick Ohmer, Bellmar, and *F. chiloensis* hybrids in California as being resistant to yellows (xanthosis). Raphael (9) reports that, in Tasmania, the Ettersburg, while not immune, appears to be more resistant to yellow edge (?) than other varieties.

## *Summary and Conclusions.*

An account is given of a degeneration disease of the Melba strawberry. Observations have shown that the disease resembles the American crinkle. In addition to the virus symptoms which appear in the autumn, what appears to be a wilt stage of the same disease may occur in the early summer when the plants are fruiting. It would seem that plants infected with the crinkle virus are unable to withstand the stress imposed on them when the first burst of hot weather in the summer occurs—this being particularly so if soil drainage is poor. The exact relationship of this wilt stage to crinkle remains to be determined.

A second degeneration disease—yellow edge (sometimes in association with crinkle)—was found to be present in plantings of the Royal Sovereign variety.

Although stocks of Melba strawberries have been observed showing 100 per cent. infection with crinkle, no evidence of yellow edge symptoms have yet been observed in this variety.

The strawberry aphid *Capitophorus fragariae* (Theo.), the vector of both crinkle and yellow edge, is widespread in Victorian strawberry plantations, particularly in the spring and autumn months.

Having reviewed overseas work on these diseases, three methods of approach to the problem of controlling yellow edge and crinkle present themselves. They are—

(1) The selection of runners which have been obtained as free from virus as possible, followed by frequent inspections during the growing season, so that all diseased plants can be removed as soon as they are detected. One of the first difficulties which would be met in carrying out this work lies in the fact that the symptoms are not always clearly defined, so that a certain degree of skill would be required to recognize the doubtful cases. The finding of some other more certain method of identifying diseased plants would, of course, overcome this difficulty.

(2) A second line of attack would be the control of the aphid vector by the application of nicotine sprays and dusts. This has been suggested by various oversea workers, but as yet no definite results of the efficacy of such a treatment are available. Hodson (14) in discussing the problem of aphis control concludes that no very complete control of the aphis, under field conditions, is likely to be achieved until a considerable advance is made in the technique of the application of insecticides.

(3) A more radical means of control lies in the development of resistant varieties. This is a long process, but appears to show promise for two reasons—

(*a*) A number of varieties and the wild species *F. chiloensis* show a marked degree of resistance, and

(*b*) the strawberry is a convenient plant for breeding, since it is propagated vegetatively, so that once the desired cross has been secured, the work is completed.

The extent to which any or all of these methods can be effectively applied under Victorian conditions has yet to be determined.

The author is grateful for the valuable assistance rendered by Messrs. Chapman Bros., Silvan.

***References.***

1. Degeneration of the Strawberry. Gard. Chron. 98, p. 47, 1935.
2. S. M. Zeller and E. K. Vaughan.—Crinkle Disease of Strawberry. Phytopath. 22, p. 709, 1932.
3. R. V. Harris.—The Strawberry Yellow Edge Disease. J. Pom. and Hort. Sc. 11, p. 56, 1933.
4. Oregon Agric. Expt. Sta., Director's Bienn. Rept., 1924–26, p. 94, 1926.
5. L. Ogilvie, T. Swarbrick, and C. R. Thompson.—A Note on a Strawberry Disease Resembling the American Crinkle. Long Ashton Res. Sta. Ann. Rept. for 1933, p. 96, 1934.
6. D. V. Howells.—Strawberry Culture: Strawberry Diseases. Scot. J. Agric. 17, p. 287, 1934.
7. I. L. Conners.—Thirteenth Annual Rept. of the Canadian Plant Disease Survey, 1933. Abst. Rev. Appl. Myc. 13, p. 563, 1934.
8. E. E. Chamberlain.—A Virus Disease of Strawberries in New Zealand. N.Z. J. Agric. 49, p. 226, 1934.
9. T. D. Raphael.—Virus Disease in Strawberries. Tas. J. Agric. 8, p. 152, 1937.
10. R. V. Harris.—Virus Diseases in Relation to Strawberry Cultivation in Great Britain. A Synopsis of Recent Experiments at East Malling. East Malling Res. Sta. Annual Rept. for 1936, p. 201, 1937.
11. A. G. Plakidas.—Strawberry Xanthosis (Yellows)—A New Insect Borne Disease. J. Agric. Res. 35, p. 1057, 1927.
12. S. M. Zeller.—Crinkle Disease of Strawberry. Oregon Agric. Expt. Sta. Bull. 319, 1933.
13. G. M. Darrow.—Strawberry Improvement. United States Dept. Agric. *Year-Book*, 1937, p. 445.
14. W. E. H. Hodson.—On the Synonymy and Biology of the Strawberry Aphis, *Capitophorus fragariae* Theo. (1912). Bul. Entom. Res. 28, p. 409, 1937.
15. R. V. Harris and A. A. Hildebrand.—An Investigation of Strawberry Virus Disease in Ontario. Can. J. Res. 15, p. 252, 1937.


# *Butter Production and Export*

The following table shows:—

(*a*) Factory production of butter and cheese in Victoria for the period July, 1937, to April, 1938, compared with the corresponding period of 1936–37; and

(*b*) Quantities and percentages of various grades of bulk butter examined in Victoria for export from 1st July, 1937, to 28th May, 1938, in comparison with the corresponding period of 1936–37.

FACTORY PRODUCTION OF BUTTER AND CHEESE IN VICTORIA (QUANTITIES IN TONS).

| Month. | Butter. | | Cheese. | |
|---|---|---|---|---|
| | 1937–38. | 1936–37. | 1937–38. | 1936–37. |
| July to February .. .. .. .. | 49,182 | 53,088 | 5,694 | 4,515 |
| March .. .. .. .. .. | 4,262* | 5,080 | 505* | 423 |
| April .. .. .. .. .. | 3,086 | 3,718 | 456 | 350 |
| Totals, ten months .. .. | 56,530 | 61,886 | 6,655 | 5,288 |

* Revised.

BULK BUTTER EXAMINED IN VICTORIA FOR EXPORT (QUANTITIES IN TONS).

| Period. | 1937–38. How Graded— | | | | Total. | Period. | 1936–37. How Graded— | | | | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ch. | 1st. | 2nd. | Pty. | | | Ch. | 1st. | 2nd. | Pty. | |
| 1st July to 30th April .. .. | 22,537 | 8,970 | 2,086 | 103 | 33,696 | 1st July to 1st May .. .. | 26,975 | 9,092 | 2,594 | 430 | 39,091 |
| 1st May to 28th May .. .. | 58 | 42 | 53 | 1 | 154 | 2nd May to 29th May .. .. | 289 | 75 | 68 | 8 | 440 |
| Totals 1st July to 28th May .. | 22,595 | 9,012 | 2,139 | 104 | 33,850 | Totals 1st July to 29th May .. | 27,264 | 9,167 | 2,662 | 438 | 39,531 |
| Percentages .. | 66·8 | 26·6 | 6·3 | 0·3 | .. | Percentages .. | 69·0 | 23·2 | 6·7 | 1·1 | .. |

# LIST OF STOCK FOODS AND STOCK LICKS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE STOCK FOODS ACT 1936, No. 4382, FOR THE YEAR 1938.

| Distinguishing Brand Name. | Guaranteed Composition. | | | Where Obtainable. |
|---|---|---|---|---|
| | Crude Protein (N × 6·25). Minimum | Crude Fat. Minimum | Crude Fibre. Maximum | |
| | % | % | % | |
| **CONCENTRATED STOCK FOODS.** | | | | |
| *Dried Blood Meal.* | | | | |
| M.C.C. Blood Meal | 66·0 | 1·0 | 5·0 | Melbourne City Council, Town Hall, Melbourne |
| Imperial Blood | 75·0 | .. | 5·0 | W. Angliss and Co. (Aust.) Pty. Ltd., 42 Bourke-street, Melbourne |
| Brooklyn | 75·0 | .. | 5·0 | Thos. Borthwick and Sons (A'asia) Ltd., 84 William-street, Melbourne |
| Clark's | 65·0 | .. | 5·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| *Meat Meal.* | | | | |
| M.C.C. Meat Meal | 63·0 | 10·0 | 5·0 | Melbourne City Council, Town Hall, Melbourne |
| M.C.C. (with bone) | 57·0 | 10·0 | 5·00 | Melbourne City Council, Town Hall, Melbourne |
| T.B. and S. in Diamond Brooklyn Meat Meal, No. 1 | 58·0 | 12·0 | 3·0 | Thos. Borthwick and Sons (A'asia) Ltd., 84 William-street, Melbourne |
| Brooklyn No. 2 | 54·0 | 12·0 | 3·00 | Thos. Borthwick and Sons (A'asia) Ltd., 84 William-street, Melbourne |
| Cal-Phoric Meat Meal | 58·0 | 12·0 | 1·0 | Western District Tallow Pty. Ltd., North-road, East Oakleigh |
| Apex Meat Meal | 53·0 | 7·2 | 2·0 | North-Eastern Bone Products, Wangaratta |
| Champion Meat Meal | 50·0 | 12·0 | 2·0 | Sims Cooper (Freezing Works) Pty. Ltd., 499 Little Collins-street, Melbourne |
| Cockbill's Meat Meal | 48·0 | 10·0 | 1·0 | W. and J. Cockbill, Footscray-road, Footscray |
| Dandy Meat Meal | 50·0 | 12·0 | 1·5 | Gippsland Co-op. Bacon Curing Co. Ltd., Dandenong |
| Apollo Meat Meal | 43·0 | 8·0 | 1·0 | J. Kitchen and Sons Pty. Ltd., Ingles-street, Port Melbourne |
| J.K.S. | 45·0 | 10·0 | 2·00 | J. Kitchen and Sons Pty. Ltd., Ingles-street, Port Melbourne |
| Pridham's Meat Meal | 53·00 | 12·00 | 1·0 | W. Pridham Pty. Ltd., Evans-street, Braybrook |
| Imperial Meat Meal | 60·00 | 9·00 | 2·0 | W. Angliss and Co. (Aust.) Pty. Ltd., 42 Bourke-street, Melbourne |
| Imperial Liver Meal | 63·00 | 18·00 | .. | W. Angliss and Co. (Aust.) Pty. Ltd., 42 Bourke-street, Melbourne |
| Imperial Bovina | 48·0 | 8·0 | 1·00 | W. Angliss and Co. (Aust.) Pty. Ltd., 42 Bourke-street, Melbourne |
| Excelsior Meat Extract Meal | 40·00 | 10·00 | .. | Rowcroft Bros., 123 William-street, Melbourne |
| Arch No. 1 (Ballarat) | 45·0 | 12·0 | 1·50 | Amalgamated Freezing Co. (Vic.) Pty. Ltd., 54 Market-street, Melbourne |
| Arch No. 2 (Bendigo) | 45·0 | 12·0 | 1·50 | Amalgamated Freezing Co. (Vic.) Pty. Ltd., 54 Market-street, Melbourne |
| Clark's Vitabeef | 52·0 | 12·0 | 2·00 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Mercury | 55·0 | 12·0 | 1·00 | H. C. Sleigh, 582 Little Collins-street, Melbourne |
| Bovaline | 68·0 | 5·0 | 4·00 | H. C. Pannifex and Co. Pty. Ltd., 4 Dudley-street, Melbourne |
| Pannifex "Best" | 40·0 | 8·0 | 3·00 | H. C. Pannifex and Co. Pty. Ltd., 4 Dudley-street, Melbourne |
| R.B.X. Special | 50·0 | 12·0 | 2·00 | Poultrymen and Farmers' Trading Co., 280 Queensberry-street, North Melbourne |
| **PREPARED STOCK FOODS.** | | | | |
| *Milk Products.* | | | | |
| Krafco | 10·0 | ·5 | .. | Kraft Walker Cheese Co. Pty. Ltd., Riverside-avenue, South Melbourne |
| Kraftone | 10·0 | ·5 | .. | Kraft Walker Cheese Co. Pty. Ltd., Riverside-avenue, South Melbourne |
| Rising Sun Buttermilk Powder | 35·0 | 5·0 | .. | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Maffco " | 30·0 | 5·0 | .. | Maffra Co-op. Milk Products Co. Ltd., Maffra |
| K.B.F. " | 29·6 | 6·3 | .. | Korumburra and District Co.-op. Butter Factory and Trading Co. Ltd., Korumburra |
| Allansford " | 30·3 | 7·0 | .. | Warrnambool Cheese and Butter Factory Co. Ltd., Allansford |
| Clark's Vitamilk | 31·0 | 6·0 | 1·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| *Oil-Seed or Cake Meals.* | | | | |
| Eta Peanut Meal | 48·0 | 1·5 | 6·0 | Nut Foods Pty. Ltd., 544 Lonsdale-street, Melbourne |
| Linseed Meal | 16·6 | 30·0 | 9·3 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Meggitt's Linseed Oil-cake Meal, M.L.M. | 27·0 | 6·0 | 13·0 | Meggitt Ltd., Hobsons-road, South Kensington |
| Meggitt's Linseed Sheep Nuts, M.L.M. | 27·0 | 6·0 | 13·0 | Meggitt Ltd., Hobsons-road, South Kensington |
| Sunlight Oil-cake | 20·0 | 5·5 | 6·5 | Lever Bros. Pty. Ltd., 565 Flinders-lane, Melbourne |
| Key Meal | 20·0 | 5·5 | 6·5 | Lever Bros. Pty. Ltd., 565 Flinders-lane, Melbourne |
| Velvet Oil-cake | 20·0 | 5·5 | 6·5 | J. Kitchen and Sons Pty. Ltd., Ingles-street, Port Melbourne |
| Velvet Oil Meal | 20·0 | 5·5 | 6·5 | J. Kitchen and Sons Pty. Ltd., Ingles-street, Port Melbourne |
| Eta Cocoanut Meal | 19·0 | 7·0 | 9·0 | Nut Foods Pty. Ltd., 544 Lonsdale-street, Melbourne |

LIST OF STOCK FOODS AND STOCK LICKS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE STOCK FOODS ACT 1936, No. 4382, FOR THE YEAR 1938—*continued.*

| Distinguishing Brand Name. | Guaranteed Composition. | | | Where Obtainable. |
|---|---|---|---|---|
| | Crude Protein (N × 6·25). Minimum | Crude Fat. Minimum | Crude Fibre. Maximum | |
| | % | % | % | |
| MIXED STOCK FOODS. | | | | |
| Codlivine | 17·0 | 17·0 | 8·0 | Osmond and Sons (Aust.) Pty. Ltd., 35 William-street, Melbourne |
| Codlivine (Poultry) | 17·0 | 17·0 | 8·0 | Osmond and Sons (Aust.) Pty. Ltd., 35 William-street, Melbourne |
| Codlivine (Pigs) | 18·0 | 16·0 | 8·0 | Osmond and Sons (Aust.) Pty. Ltd., 35 William-street, Melbourne |
| Harpers Star Calf Food | 12·0 | 15·0 | 6·0 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Parsons Calf Food | 11·5 | 14·0 | 6·5 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Hockings Calf Food | 11·1 | 2·8 | 3·4 | J. Hocking and Sons Pty. Ltd., 243 Dandenong-road, East Malvern |
| Lyall's Calf Food | 10·5 | 4·2 | 3·0 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Ayrshire Calf Food | 13·35 | 2·49 | 3·14 | James Railton, 133 Elizabeth-street, Melbourne |
| Ward's Calf Food | 9·0 | 3·0 | 7·0 | H. S. K. Ward Pty. Ltd., 24–38 Spencer-street, Melbourne |
| Mermaid Growing Mash | 16·0 | 3·5 | 6·0 | National Utility Poultry Breeders' Assoc. Co. Ltd., 537 Flinders-street, Melbourne |
| Mermaid Chick Mash | 11·0 | 3·5 | 6·0 | National Utility Poultry Breeders' Assoc. Co. Ltd., 537 Flinders-street, Melbourne |
| Mermaid Laying Mash | 16·0 | 3·5 | 7·0 | National Utility Poultry Breeders' Assoc. Co. Ltd., 537 Flinders-street, Melbourne |
| Hocking's Growing Mash | 14·07 | 5·9 | 5 2 | J. Hocking and Sons Pty. Ltd., 243 Dandenong-road, East Malvern |
| Hocking's Laying Mash | 14·05 | 4·5 | 4·2 | J. Hocking and Sons Pty. Ltd., 243 Dandenong-road, East Malvern |
| White's Growing Mash | 14·5 | 3·0 | 8·0 | White, Hancock, and Mills Pty. Ltd., 296–306 City-road, South Melbourne |
| White's Eg-a-da | 46·0 | 9·0 | 1·0 | White, Hancock, and Mills Pty. Ltd., 296–306 City-road, South Melbourne |
| White's Werribee Meal | 13·0 | 4·0 | 3·0 | White, Hancock, and Mills Pty. Ltd., 296–306 City-road, South Melbourne |
| White's Laying Mash | 16·0 | 2·5 | 8·0 | White, Hancock, and Mills Pty. Ltd., 296–306 City-road, South Melbourne |
| Ward's Chick Meal | 10·0 | 4·0 | 5·0 | H. S. K. Ward Pty. Ltd., 24–38 Spencer-street, Melbourne |
| Lyall's Laying Mash | 13·6 | 4·3 | 7·3 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Lyall's Werribee Mash | 8·4 | 3·0 | 6·0 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Lyall's Growing Mash | 9·0 | 3·4 | 7·0 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Harper's Star Chick Flakes | 10·0 | 9·0 | 5·0 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Harper's Star Chick Food | 10·0 | 8·5 | 5·0 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Clark's Laying Mash | 19·0 | 6·0 | 6·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Clark's Growing Mash | 16·0 | 7·0 | 6·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Clark's Werribee Meal | 13·0 | 4·0 | 5·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Clark's Eggoleen | 40·0 | 12·0 | 3·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Clark's Chick-starter | 16·0 | 7·0 | 6·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Taylors National Calf Food | 13·5 | 6·5 | 5·5 | National Cattle and Poultry Food Co., 64A King-street, Melbourne |
| Baird's Laying Mash | 15·0 | 5·0 | 6·0 | G. W. and H. P. Baird Pty. Ltd., 15–33 Queens-parade, Clifton Hill |
| Baird's Growing Mash | 13·5 | 4·5 | 5·0 | G. W. and H. P. Baird Pty. Ltd., 15–33 Queens-parade, Clifton Hill |
| Warragul Laying Mash | 14·05 | 4·5 | 4·2 | Warragul Egg Circle, Warragul |
| Warragul Growing Mash | 14·07 | 5·9 | 5·2 | Warragul Egg Circle, Warragul |
| Vita-lick Pig Mixture (V.P.M.)* | 13·2 | 1·8 | 3·2 | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita-lick Mineral Mixture (V.M.M.)* | 7·7 | 7·8 | 3·1 | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Kaf-o-Vite | 14·3 | 12·3 | 5·6 | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| P & F Growing Mash | 14·0 | 4·0 | 5·3 | Poultrymen and Farmers' Trading Co., 280–286 Queensberry-street, North Melbourne |
| P and F Competition Laying Mash | 18·0 | 5·0 | 6·5 | Poultrymen and Farmers' Trading Co., 280–286 Queensberry-street, North Melbourne |
| P & F Werribee Mixture | 10·5 | 3·5 | 6·0 | Poultrymen and Farmers' Trading Co., 280–286 Queensberry-street, North Melbourne |
| Vita-Pro-Teen | 6·5 | 3·0 | 10·2 | Buzacott Sprays Pty. Ltd., 249 Franklin-street, Melbourne |
| Allkon "Protovite" | 30·0 | 6·5 | 7·0 | Allkon Pty. Ltd., 34 Queen-street, Melbourne |
| Harper's Prepared Grain (Poultry) | 9·0 | 9·0 | 4·50 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |

* Contains minerals—phosphates, &c.

LIST OF STOCK FOODS AND STOCK LICKS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE STOCK FOODS ACT 1936, No. 4382, FOR THE YEAR 1938—*continued.*

| Distinguishing Brand Name. | Guaranteed Composition. | | | Where Obtainable. |
|---|---|---|---|---|
| | Crude Protein (N × 6·25). Minimum | Crude Fat. Minimum | Crude Fibre. Maximum | |
| | % | % | % | |
| WHEAT AND WHEAT BY-PRODUCTS. | | | | |
| Mermaid Wheat Meal | 10·00 | 1·5 | 3·0 | National Utility Poultry Breeders' Assoc. Co. Ltd., 537 Flinders-street, Melbourne |
| Hocking's Wheat Meal | 12·35 | 3·0 | 3·6 | J. Hocking and Sons Pty. Ltd., 243 Dandenong-road, East Malvern |
| Lyall's Wheat Meal | 8·20 | 2·7 | 3·3 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Clark's Wheat Meal | 9·00 | 1·0 | 3·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Baird's Wheat Meal | 10·90 | 2·3 | 2·5 | G. W. and H. P. Baird Pty. Ltd., 15-33 Queens-parade, Clifton Hill |
| P & F Wheat Meal | 14·0 | 4·0 | 5·3 | Poultrymen and Farmers' Trading Co., 280 Queensberry-street, North Melbourne |
| BRAN AND POLLARD. | | | | |
| The following firms have registered distinguishing brand names for Bran† and Pollard‡:— | | | | |
| Barwon Flour Mills | .. | .. | .. | 40 Little Malop-street, Geelong |
| Brunton and Co. Pty. Ltd. | .. | .. | .. | 531 Collins-street, Melbourne |
| Burnley Flour Mills Pty. Ltd. | .. | .. | .. | 376 Swan-street, Burnley |
| Burrows, John, Pty. Ltd. | .. | .. | .. | Albury, New South Wales |
| Corowa Milling Co. Ltd. | .. | .. | .. | Corowa, New South Wales |
| Darling (John) and Son | .. | .. | .. | 44 King-street, Melbourne |
| Echuca Flour Mills Pty. Ltd. | .. | .. | .. | Echuca |
| Garden City Flour Milling Co. Pty. Ltd. | .. | .. | .. | Trench-street, Ballarat |
| Grant and Wilson Pty. Ltd. | .. | .. | .. | McNally-street, Yarrawonga |
| Kimpton (W. S.) and Sons | .. | .. | .. | 422 Collins-street, Melbourne |
| Malcolm (James) and Co. Pty. Ltd. | .. | .. | .. | St. Arnaud |
| Maryborough Flour Mills Pty. Ltd. | .. | .. | .. | Maryborough |
| McLennan and Co. Pty. Ltd. | .. | .. | .. | Mooroopna |
| Minifie (James) and Co. | .. | .. | .. | 422 Collins-street, Melbourne |
| Noske Bros. Pty. Ltd. | .. | .. | .. | 108 Queen-street, Melbourne |
| Schutt and Barrie Pty. Ltd. | .. | .. | .. | Geelong-road, West Footscray |
| Silver Lake Flour Milling Co. | .. | .. | .. | Sale |
| Smith (W. and P.) | .. | .. | .. | 35 Cusack-street, Wangaratta |
| Stratton and Co. Pty. Ltd. | .. | .. | .. | 68 Lulie-street, Abbotsford |
| Sunraysia Flour Mills Pty. Ltd. | .. | .. | .. | Mildura |
| The Tooronga Milling Co. Pty. Ltd. | .. | .. | .. | Auburn-road, Tooronga, Melbourne |
| Thomas (W. C.) and Sons Pty. Ltd. | .. | .. | .. | 55 William-street, Melbourne |
| Tomlins, Simmie, and Co. Pty. Ltd. | .. | .. | .. | Bendigo |
| Wangaratta Flour Mills Co. Pty. Ltd. | .. | .. | .. | Wangaratta |
| Willis Bros. | .. | .. | .. | Kyneton |
| Wimmera Flour Mill Co. Pty. Ltd. | .. | .. | .. | Stawell |
| Water and Kerang United Roller Mills Ltd. | .. | .. | .. | 108 Queen-street, Melbourne |
| † The 1938 Chemical Standard for Bran is | 14·0 | 2·5 | 10·0 | |
| ‡ The 1938 Chemical Standard for Pollard is | 14·0 | 3·0 | 7·0 | |
| OAT PRODUCTS. | | | | |
| Parson's No. 1 Oat Branning | 10·00 | 6·75 | 16·0 | Parsons Bros. and Co. Pty. Ltd., 554-562 Flinders-lane, Melbourne |
| Parson's No. 2 Oat Branning | 7·50 | 5·75 | 15·25 | Parsons Bros. and Co. Pty. Ltd., 554-562 Flinders-lane, Melbourne |
| Harper's Star Oat Branning | 9·00 | 6·00 | 25·00 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Parson's No. 2 Oat Screenings | 8·50 | 5·50 | 13·25 | Parsons Bros. and Co. Pty. Ltd., 554-562 Flinders-lane, Melbourne |
| Parson's No. 3 Oat Screenings | 7·00 | 5·00 | 21·25 | Parsons Bros. and Co. Pty. Ltd., 554-562 Flinders-lane, Melbourne |
| Fleming's No. 1 Oat Branning | 8·50 | 5·50 | 25·00 | Fleming and Co. (Aust.) Pty. Ltd., Sunbury-road, Footscray |
| Ward's Oat Branning | 6·00 | 4·00 | 25·00 | H. S. K. Ward Pty. Ltd., 24-38 Spencer-street, Melbourne |
| Connell's Oat Branning | 11·30 | 8·50 | 14·00 | John Connell and Co. Ltd., 578 Bourke-street, Melbourne |
| Connell's Oat Pollard | 11·80 | 9·00 | 2·00 | John Connell and Co. Ltd., 578 Bourke-street, Melbourne |
| Lyall's Oat Pollard | 9·60 | 7·00 | 7·00 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Hocking's Oat Pollard | 12·56 | 5·10 | 3·90 | J. Hocking and Sons Pty. Ltd., 243 Dandenong-road, East Malvern |
| Clark's Oat Pollard | 12·00 | 7·00 | 5·00 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |

LIST OF STOCK FOODS AND STOCK LICKS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE STOCK FOODS ACT 1936, No. 4382, FOR THE YEAR 1938—*continued.*

| Distinguishing Brand Name. | Guaranteed Composition. | | | Where Obtainable. |
|---|---|---|---|---|
| | Crude Protein (N × 6·25). Minimum | Crude Fat. Minimum | Crude Fibre. Maximum | |
| | % | % | % | |
| OAT PRODUCTS—*continued.* | | | | |
| McKenzie's Oat Pollard | 10·00 | 8·00 | 5·00 | J. F. McKenzie and Co. Pty. Ltd., 192 Arden-street, North Melbourne |
| McKenzie's Oat Branning | 7·00 | 4·00 | 20·00 | J. F. McKenzie and Co. Pty. Ltd., 192 Arden-street, North Melbourne |
| P & F Oaten Meal | 8·30 | 6·00 | 3·00 | Poultrymen and Farmers' Trading Co., 280 Queensberry-street, North Melbourne |
| BARLEY PRODUCTS. | | | | |
| Harper's Star Barley Meal | 15·0 | 5·50 | 2·0 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Ward's Barley Meal | 10·0 | 4·00 | 10·0 | H. S. K. Ward Pty. Ltd., 24–38 Spencer-street, Melbourne |
| Lyall's Barley Meal | 9·2 | 2·40 | 4·3 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Connell's Barley Meal | 10·4 | 4·50 | 3·0 | John Connell and Co. Ltd., 578 Bourke-street, Melbourne |
| Connell's Barley Branning | 10·4 | 6·00 | 9·0 | John Connell and Co. Ltd., 578 Bourke-street, Melbourne |
| Harper's Star Barley Branning | 14·5 | 6·50 | 2·0 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Parson's Barley and Oat Pollard | 11·0 | 5·50 | 10·0 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Lyall's Barley and Oat Meal | 9·3 | 4·30 | 7·0 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| McKenzie Barley Pollard | 12·0 | 3·00 | 20·0 | J. F. McKenzie and Co. Pty. Ltd., 192 Arden-street, North Melbourne |
| P & F Barley Meal | 8·3 | 1·30 | 4·5 | Poultrymen and Farmers' Trading Co., 280 Queensberry-street, North Melbourne |
| RICE PRODUCTS. | | | | |
| Harper's Rice Bran | 5·0 | 6·0 | 40·0 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Harper's Star White Rice Meal | 10·0 | 15·0 | 8·5 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Harper's Star Brown Rice Meal | 10·0 | 20·0 | 8·5 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Parson's Rice Meal | 10·0 | 19·0 | 9·5 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| McKenzie's Rice Pollard | 10·0 | 15·0 | 8·0 | J. F. McKenzie and Co. Pty. Ltd., 192 Arden-street, North Melbourne |
| MAIZE PRODUCTS. | | | | |
| Polly Gluten Feed | 23·0 | 3·0 | 9·0 | Maize Products Pty. Ltd., corner Parker and Maribyrnong streets, Footscray |
| Hocking's Maize Meal | 8·25 | 4·25 | 3·5 | J. Hocking and Sons Pty. Ltd., 243 Dandenong-road, East Malvern |
| Ward's Maize Meal | 7·0 | 3·0 | 4·0 | H. S. K. Ward Pty. Ltd., 24–38 Spencer-street, Melbourne |
| Lyall's Maize Meal | 7·6 | 3·2 | 2·6 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| Mermaid Maize Meal | 9·0 | 1·5 | 4·0 | National Utility Poultry Breeders' Assoc. Co. Ltd., 537 Flinders-street, Melbourne |
| Maize Oil Meal | 16·0 | 12·0 | 10·0 | Maize Products Pty. Ltd., corner Parker and Maribyrnong streets, Footscray |
| Parson's Wet Maize Bran | 3·0 | 1·0 | 2·0 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Clark's Maize Meal | 7·0 | 3·0 | 3·0 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| White's Maize Meal | 7·0 | 3·0 | 3·0 | White, Hancock, and Mills Pty. Ltd., 296 City-road, South Melbourne |
| PEA PRODUCTS. | | | | |
| Parson's Pea Meal | 16·00 | 1·50 | 18·75 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Hocking's Pea Meal | 17·55 | 2·20 | 12·95 | J. Hocking and Sons Pty. Ltd., 243 Dandenong-road, East Malvern |
| Ward's Pea Meal | 14·00 | 1·00 | 18·00 | H. S. K. Ward Pty. Ltd., 24–38 Spencer-street, Melbourne |
| Harper's Whole Pea Screenings | 20·00 | 1·00 | 5·00 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Harper's Split Pea Screenings | 15·00 | 1·00 | 5·00 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| Parson's Pea Screenings | 16·25 | 1·00 | 6·00 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Clark's Pea Meal | 18·00 | 1·00 | 15·00 | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| McKenzie's Pea Meal | 17·00 | 1·00 | 18·00 | J. F. McKenzie and Co. Pty. Ltd., 192 Arden-street, North Melbourne |

LIST OF STOCK FOODS AND STOCK LICKS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE STOCK FOODS ACT 1936, No. 4382, FOR THE YEAR 1938—*continued.*

| Distinguishing Brand Name. | Guaranteed Composition. | | | Where Obtainable. |
|---|---|---|---|---|
| | Crude Protein N + 6·25). Minimum. | Crude Fat. Minimum. | Crude Fibre. Maximum. | |
| | % | % | % | |
| **HULLS.** | | | | |
| Parson's Barley Hulls | 2·50 | ·60 | 39·75 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| McKenzie's Pea Hulls | 6·00 | ·50 | 40·00 | J. F. McKenzie and Co. Pty. Ltd., 192 Arden-street, North Melbourne |
| Parson's Pea Hulls | 3·50 | ·40 | 46·25 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Parson's Oat Hulls (A) | 1·25 | ·40 | 40·75 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Parson's Oat Hulls (B) | 4·25 | 3·00 | 30·00 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Parson's Oat Hulls (C) | 5·00 | 1·25 | 34·00 | Parsons Bros. and Co. Pty. Ltd., 554–562 Flinders-lane, Melbourne |
| Ward's Barley Hulls | 2·00 | ·80 | 32·00 | H. S. K. Ward Pty. Ltd., 24–38 Spencer-street, Melbourne |
| Ward's Pea Hulls | 5·00 | ·25 | 40·00 | H. S. K. Ward Pty. Ltd., 24–38 Spencer-street, Melbourne |
| Ward's Oat Hulls | 1·50 | ·70 | 35·00 | H. S. K. Ward Pty. Ltd., 24–38 Spencer-street, Melbourne |
| Connell's Barley Hulls | 5·00 | ·25 | 18·00 | John Connell and Co. Ltd., 578 Bourke-street, Melbourne |
| Connell's Oat Hulls | ·50 | ·50 | 35·00 | John Connell and Co. Ltd., 578 Bourke-street, Melbourne |
| Fleming's Oat Hulls | 2·00 | 1·00 | 32·50 | Fleming and Co. (Aust.) Pty. Ltd., Bunbury-road, West Footscray |
| Harper's Oat Hulls | 2·00 | 1·00 | 30·00 | Robert Harper and Co. Ltd., 390 Flinders-lane, Melbourne |
| McKenzie's Oat Hulls | 1·50 | 1·00 | 35·00 | J. F. McKenzie and Co. Pty. Ltd., 192 Arden-street, North Melbourne |
| **LUCERNE.** | | | | |
| Lucerne Meal | 12·3 | 2·4 | 25·00 | Lyall and Sons Pty. Ltd., 39 Leveson-street, North Melbourne |
| **BAKEHOUSE REFUSE.** | | | | |
| Bakehouse Sweepings | 2·0 | 2·0 | 2·0 | Swallow and Ariel Ltd., 60 Stokes-street, Port Melbourne |
| Biscuit Sweepings | 2·0 | 2·0 | 2·0 | Swallow and Ariel Ltd., 60 Stokes-street, Port Melbourne |

## STOCK LICKS.

| Distinguishing Brand Name. | Guaranteed Composition. | | | | | | | Where Obtainable. |
|---|---|---|---|---|---|---|---|---|
| | Salt. | Phosphoric Acid. | Lime. | Magnesia. | Iron. (as $Fe_2O_3$). | Sulphur. | Iodine. | |
| | % (Max.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | |
| **STOCK LICKS.** | | | | | | | | |
| *Common Salt.* | | | | | | | | |
| "Lepp" Salt Lick | 100·0 | .. | .. | .. | .. | .. | .. | J. S. Corden and Co. (Vic.) Pty. Ltd., 44–54 Spencer-street, Melbourne |
| Cresco Salt Lick, 100 per cent. | 100·0 | .. | .. | .. | .. | .. | .. | Cresco Fertilizers Ltd., Geelong |
| Ram Salt Lick, 100 per cent. | 100·0 | .. | .. | .. | .. | .. | .. | Cheetham Salt Pty. Ltd., 71 Little Malop-street, Geelong |
| C.F.C. Stock Salt, 100 per cent. | 100·0 | .. | .. | .. | .. | .. | .. | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| Ram-Lic | 97·0 | .. | .. | .. | .. | 3·0 | .. | Cheetham Salt Pty. Ltd., 71 Little Malop-street, Geelong |
| I.C.I. Stock Salt | 100·0 | .. | .. | .. | .. | .. | .. | Industrial Chemicals Pty. Ltd., 380 Collins-street, Melbourne |

LIST OF STOCK FOODS AND STOCK LICKS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE STOCK FOODS ACT 1936, No. 4382, FOR THE YEAR 1938—*continued.*

| Distinguishing Brand Name. | Guaranteed Composition. | | | | | | | Where Obtainable. |
|---|---|---|---|---|---|---|---|---|
| | Salt. | Phosphoric Acid. | Lime. | Magnesia. | Iron. (as $Fe_2O_3$). | Sulphur. | Iodine. | |
| STOCK LICKS—*continued.* | % (Max.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | |
| *Bone Meal, &c.* | | | | | | | | |
| Cockbill's Bone Meal | .. | 21·76 | 27·60 | .. | .. | .. | .. | W. and J. Cockbill, Footscray-road, Footscray |
| Apex Sterilized Bone Meal | .. | 25·20 | 29·80 | .. | .. | .. | .. | North Eastern Bone Products, Wangaratta |
| Nuelife Bone Meal | .. | 24·50 | 32·00 | .. | .. | .. | .. | E. F. Peters and Sons Pty. Ltd., Dunolly |
| G.B.P. Bone Meal | .. | 23·00 | 30·00 | .. | .. | .. | .. | Ronchi Bros., 87 Raymond-street, Sale |
| Tricalos Sterilized Bone Flour | .. | 32·50 | 40·00 | .. | .. | .. | .. | Glues and By-Products Pty. Ltd., 86 King-street, Melbourne |
| Cockbill's Bone Grit | .. | 20·00 | 25·27 | .. | .. | .. | .. | W. and J. Cockbill, Footscray-road, Footscray |
| Clark's Bone Meal | .. | 21·00 | 46·0 | .. | .. | .. | .. | Clark, King, and Co. Pty. Ltd., 237 Queen-street, Melbourne |
| Champion Bone Meal | .. | 21·00 | 46·0 | .. | .. | .. | .. | H. C. Pannifex and Co. Pty. Ltd., 4 Dudley-street, Melbourne |
| *Miscellaneous.* | | | | | | | | |
| C.F.C. Di-Calcic Phosphate | .. | 37·50 | 29·57 | .. | .. | .. | .. | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| C.F.C. Di-Calcic Lick, No. 1 | 65·00 | 9·38 | 7·39 | .. | .. | .. | .. | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| C.F.C. Di-Calcic Lick, No. 2 | 71·00 | 5·63 | 4·44 | ·49 | ·29 | 5·00 | .. | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| C.F.C. Di-Calcic Lick, No. 2 (with Iodine) | 71·00 | 5·63 | 4·44 | ·49 | ·29 | 5·00 | ·05 | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| C.F.C. Di-Calcic Concentrate, No. 3 | .. | 23·44 | 18·48 | 2·03 | 1·20 | 20·83 | .. | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| C.F.C. Di-Calcic Concentrate, No. 3 (with Iodine) | .. | 23·44 | 18·48 | 2·03 | 1·20 | 20·83 | ·19 | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| C.F.C. Bone Lick (with Iodine) | 61·00 | 6·53 | 8·28 | ·49 | ·29 | 5·00 | ·05 | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| C.F.C. Ground Phosphate | .. | 36·65 | 49·50 | .. | .. | .. | .. | Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne |
| Cresco Di-Calcic Lick, No. 1 | 65·00 | 6·50 | 6·50 | .. | .. | .. | .. | Cresco Fertilizers Ltd., Geelong |
| Cresco Di-Calcic Lick, No. 2 | 71·00 | 3·80 | 3·80 | ·30 | ·20 | 4·50 | ·04 | Cresco Fertilizers Ltd., Geelong |
| Cresco Di-Calcic Lick | 90·00 | 2·50 | 2·50 | .. | .. | .. | .. | Cresco Fertilizers Ltd., Geelong |
| Cresco Concentrated Di-Calcic Lick | .. | 25·00 | 25·00 | .. | .. | .. | .. | Cresco Fertilizers Ltd., Geelong |
| Cresco Calcium Phosphate Lick | 65·00 | 1·30 | 16·00 | .. | .. | .. | .. | Cresco Fertilizers Ltd., Geelong |
| Cresco Calcium Phosphate Copper Lick | 58·00 | 1·30 | 18·50 | .. | .. | .. | .. | Cresco Fertilizers Ltd., Geelong |
| Cresco Calcium Phosphate Copper Iodine Lick | 67·50 | 1·20 | 13·50 | .. | .. | .. | ·35 | Cresco Fertilizers Ltd., Geelong |
| Cresco Calcium Copper Lick | 65·00 | .. | 16·00 | .. | .. | .. | .. | Cresco Fertilizers Ltd., Geelong |
| Cresco Calcium Copper Iodine Lick | 65·00 | .. | 15·90 | .. | .. | .. | ·35 | Cresco Fertilizers Ltd., Geelong |
| Vic-Lic Sheep Lick D | .. | 28·77 | 30·57 | .. | 4·28 | .. | ·03 | Wilcox Mofflin Ltd., Henty House, 499 Little Collins-street, Melbourne |
| Vic-Lic Sheep Lick G | .. | 29·02 | 31·10 | .. | 7·37 | .. | ·03 | Wilcox Mofflin Ltd., Henty House, 499 Little Collins-street, Melbourne |
| Vigoreen Concentrate | 15·00 | 11·00 | 16·80 | 1·95 | 1·50 | 6·00 | ·09 | Victor Leggo and Farmers Ltd., 222 Queen-street, Melbourne |
| Osmond's Concentrated Lick | .. | 12·0 | 7·00 | 1·3 | ·6 | 2·0 | ·04 | Osmond and Sons (Aust.) Pty. Ltd., 35 William-street, Melbourne |
| Osmond's Tonica Stock Lick | 75·0 | 6·0 | 2·50 | ·2 | ·3 | 2·5 | ·04 | Osmond and Sons (Aust.) Pty. Ltd., 35 William-street, Melbourne |
| Salvitis Lick | 90·0 | 1·8 | 2·50 | ·2 | ·8 | ·4 | .. | Cheetham Salt Pty. Ltd., 71 Little Malop-street, Geelong |
| Salvitis Concentrate | .. | 18·7 | 25·00 | 2·1 | 8·4 | 4·4 | .. | Cheetham Salt Pty. Ltd., 71 Little Malop-street, Geelong |
| Calphosfer | .. | 28·70 | 33·55 | ·20 | 7·5 | .. | .. | Hamilton Laboratories Pty. Ltd., 532 Bourke-street, Melbourne |
| C-Lik | 22·0 | 8·00 | 20·00 | 4·00 | 3·0 | .. | .. | Deepsea Stock Foods, 527 Collins-street, Melbourne |
| Mineralox | 22·0 | 8·00 | 20·00 | 4·00 | 3·0 | .. | .. | Deepsea Stock Foods, 527 Collins-street, Melbourne |
| Vita Lick Concentrated D | .. | 13·00 | 17·30 | 1·30 | 1·7 | 8·0 | Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |

LIST OF STOCK FOODS AND STOCK LICKS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE STOCK FOODS ACT 1936, No. 4382, FOR THE YEAR 1938—*continued.*

| Distinguishing Brand Name. | Guaranteed Composition. | | | | | | | Where Obtainable. |
|---|---|---|---|---|---|---|---|---|
| | Salt. | Phosphoric Acid. | Lime. | Magnesia. | Iron. (as $Fe_2O_3$). | Sulphur. | Iodine. | |
| | % (Max.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | % (Min.) | |
| *Miscellaneous.*—continued. | | | | | | | | |
| Vita Lick Concentrated G .. | .. | 19·50 | 25·90 | 1·30 | 1·7 | 8·0 | Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita-Lick Mixed D .. .. | 75·0 | 2·40 | 3·20 | ·25 | ·33 | 1·5 | Mere Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita-Lick Mixed G .. .. | 75·0 | 3·67 | 4·93 | ·25 | ·33 | 1·5 | Mere Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita-Lick Extra Strength Mixed D | 62·0 | 4·00 | 5·35 | ·40 | ·55 | 2·5 | Mere Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita Lick Extra Strength Mixed G | 62·0 | 6·10 | 8·10 | ·40 | ·55 | 2·5 | Mere Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Por-co-vite .. .. .. | 12·8 | 19·20 | 24·30 | ·83 | ·30 | 10·0 | Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Chic-a-vite .. .. .. | .. | 20·70 | 27·60 | 1·43 | 1·80 | 1·8 | Mere Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita Lick Mineralized Block .. | 82·0 | 2·15 | 4·90 | ·83 | ·10 | .. | .. | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Carbofos Mineralized Block .. | 77·0 | 4·30 | 7·75 | ·80 | ·10 | .. | .. | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita Lick Red Blocks .. | 82·0 | 2·15 | 4·90 | ·83 | ·55 | .. | Merest Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita Lick Cattle Lick Concentrated D | .. | 15·77 | 20·50 | 1·33 | ·90 | 2·10 | Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita Lick Cattle Lick Concentrated G | .. | 20·55 | 26·70 | 1·33 | 1·80 | 2·10 | Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita Lick Cattle Lick Mixed D .. | 74·0 | 2·84 | 3·70 | ·24 | ·17 | ·39 | Merest Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita Lick Cattle Lick Mixed G .. | 74·0 | 3·76 | 4·91 | ·24 | ·35 | ·39 | Merest Trace | Vita-Lick Pty. Ltd., 493–495 Collins-street, Melbourne |
| Vita Lick Mineralized Salt Fodder | 25·00 | .. | .. | .63. | ·15 | .. | .. | Vita-Lick Pty. Ltd., 493 Collins-street, Melbourne |
| Foddalik (FL in square) .. | .. | 13·00 | 27·60 | 5·60 | 1·10 | .. | Merest Trace | The Mineral Foods Co. of Australia Pty. Ltd., Henty House, Little Collins-street, Melbourne |
| Allkon Block Lick .. .. | 91·0 | 1·90 | 3·00 | .. | .. | .. | .. | Allkon Pty. Ltd., 34 Queen-street, Melbourne |
| Allkon Lick, No. 1 .. .. | 8·0 | 19·00 | 30·00 | .. | 1·00 | .. | Trace | Allkon Pty. Ltd., 34 Queen-street, Melbourne |
| Immunolic Concentrate .. | 8·0 | 19·00 | 30·00 | .. | 1·00 | .. | Trace | Hart and Co. Pty. Ltd., 72–86 Whiteman-street, South Melbourne |
| Immunol Block Lick .. .. | 91·0 | 1·90 | 3·00 | .. | .. | .. | .. | Hart and Co. Pty. Ltd., 72–86 Whiteman-street, South Melbourne |
| Sulphurized Block Lick .. | 98·0 | .. | .. | .. | .. | 2·00 | .. | Hart and Co. Pty. Ltd., 72–86 Whiteman-street, South Melbourne |
| Allkon Lick, No. 2 .. .. | 5·0 | 15·00 | 25·00 | .. | 1·00 | 1·0 | Trace | Allkon Pty. Ltd., 34 Queen-street, Melbourne |
| Allkon Organic Lime Compound | .. | .. | 7·00 | .. | .. | .. | .. | Allkon Pty. Ltd., 34 Queen-street, Melbourne |
| Hart's Immunol Organic Lime Compound | .. | .. | 7·00 | .. | .. | .. | .. | Hart and Co. Pty. Ltd., 72–86 Whiteman-street, South Melbourne |
| Vic-Lic Mixed G .. .. | 78·0 | 5·50 | 6·00 | .. | 1·4 | .. | Trace | Wilcox Mofflin Ltd., Henty House, 499 Little Collins-street, Melbourne |
| Vic-Lic Mixed D .. .. | 78·0 | 5·50 | 6·00 | .. | ·7 | .. | Trace | Wilcox Mofflin Ltd., Henty House, 499 Little Collins-street, Melbourne |
| Vic-Lic Concentrated .. .. | 5·0 | 29·02 | 31·10 | .. | 4·28 | .. | Trace | Wilcox Mofflin Ltd., Henty House, 499 Little Collins-street, Melbourne |
| Evans Specific .. .. | .. | 3·00 | 13·40 | 2·22 | 40·00 | 10·00 | Trace | Thomas' Sheep and Cattle Dips Pty. Ltd., 47 Adam-street, Burnley |
| C & B Tonic Mineral .. .. | 63·00 | 12·07 | 9·50 | ·70 | ·40 | 7·70 | .. | J. S. Brewer, Rossiter's-road, Koo-wee-rup |
| Pegalick .. .. .. | 35·60 | 14·40 | .. | .. | ·20 | 4·70 | ·04 | Pegasus Pty. Ltd., 56 Hunter-street, Sydney |
| Kelp-Lik .. .. .. | .. | 23·00 | 32·00 | 1·50 | 1·40 | 10·00 | .. | Kelp-Lik Products Pty. Ltd., 343 Little Collins-street, Melbourne |
| Nitra-Min "A" .. .. | 38·80 | 7·38 | 26·74 | ·60 | ·43 | 1·60 | Trace | S. N. Rodda Pty. Ltd., 47 William-street, Melbourne |
| Vetsolick .. .. .. | Trace | 19·00 | 26·20 | ·65 | 1·55 | 14·20 | .. | A. H. McDonald Pty. Ltd., 568 Bridge-road, Richmond |
| D.G.L. .. .. .. | .. | 23·00 | 32·00 | 1·50 | 1·40 | 10·00 | .. | D. G. Officer Pty. Ltd., 90 William-street, Melbourne |
| Rudduck's Medicated Tonic .. | 60·0 | 8·20 | 7·80 | ·71 | .. | 5·20 | .. | Rudduck and Co. Pty. Ltd., 556 Lonsdale-street, Melbourne |
| Rudduck's Improved Mineral Lick | 20·0 | 16·00 | 24·00 | ·60 | ·88 | 2·00 | Trace | Rudduck and Co. Pty. Ltd., 556 Lonsdale-street, Melbourne |
| Rudduck's Tonic and Vermicide | .. | 18·80 | 26·00 | 1·00 | 1·30 | ·50 | ·04 | Rudduck and Co. Pty. Ltd., 556 Lonsdale-street, Melbourne. |

Melbourne, 30th March, 1938.

W. R. JEWELL, M.Sc.,
Chemist for Agriculture.

# Licensed Skin Buyers (Supplementary List)

## Sheep Owners Protection Act

Following is a list of persons licensed under the Sheep Owners Protection Act to buy raw sheep skins. The licences have effect until the 31st December, 1938.

| Licence No. | Name. | Address. |
|---|---|---|
| 724 | Allee, Jos. .. | Violet Town |
| 723 | Egan, F. H. .. | Tanwood |
| 728 | Greenfield, B. .. | 73 Amess-street, North Carlton |
| 725 | Greenwood, A. .. | Omeo |
| 751 | Hardy, F. A. .. | Myamyn |
| 732 | Hardy, J. H. .. | Campbell-street, Port Fairy |
| 745 | Jones, J. T. .. | 44 Through-street, Burwood |
| 731 | Kelly, W. A. .. | Penshurst |
| 734 | Khan, Bunna .. | Market Square, Bendigo |
| 741 | Kewin, R. F., and Co. | Wheeler-street, Corryong |
| 743 | Lipton, F. .. | Cyril-street, Elwood |
| 727 | McColl, D. .. | Tatura |
| 729 | McGrath, L. J. .. | 474 Parkinson-street, Albury, N.S.W. |
| 750 | McKerrow, H. S. | Swan Hill |
| 726 | McLean, E. .. | Cobden |
| 740 | Orloff, J. .. | 443 Rathdown-street, Carlton |
| 730 | Perkins, C. .. | Bay-road, Mt. Gambier, S.A. |
| 746 | Robbins, T. .. | Cohuna |
| 749 | Scanlon, M. .. | 9 Haines-street, North Melbourne |
| 733 | Sproul, L. J. .. | Regent-street Port Fairy |
| 748 | Stetson, R. .. | Harris-street, Corryong |
| 739 | Tait, A. H. .. | Swan Hill |
| 742 | Todd, P. .. | 553 Stanley-street, Albury, N.S.W. |
| 737 | Wheaton and Brown | New-street, Miram |
| 744 | Wilkinson, G. R. .. | Manangatang |
| 738 | Yarde, L. W. .. | Campbell-street, Swan Hill |
| 747 | Young, R. .. | 3 Burnley-street, Richmond |

## Book Review

***Standard Apparatus and Methods for Determining the Percentage of Fat in Milk and Milk Products by the Babcock Method. B.S. No. 755. Part I.—Apparatus; Part II.—Methods.***

THE Imperial Agricultural Research Conference of 1927 endorsed a suggestion made by the National Physical Laboratory as to the need for establishing greater uniformity in the specifications for volumetric glassware used in testing milk and milk products, and took steps to put the necessary work of standardization in hand.

The detailed work was begun by the Dairy Research Committee of the Empire Marketing Board, and in March, 1934, this Committee issued a "Report on Standard Apparatus and Methods for the Gerber and Babcock Tests and on Floating Dairy Thermometers."

On the abolition of the Empire Marketing Board in September, 1933, the work was continued by the British Standards Institution.

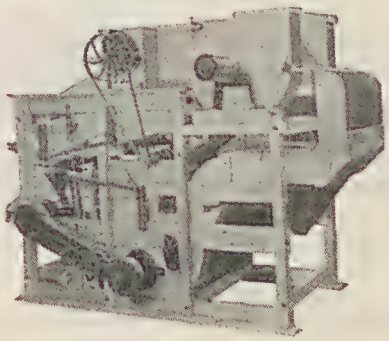
The "Apparatus and Methods for the Determination of Fat in Milk and Milk Products by the Gerber Method" were published in 1936, and the present publications deal with the "Apparatus and Methods for the Determination of Fat in Milk and Milk Products by the *Babcock* Method."

As the Babcock method is extensively used in this country, the two publications dealing with this method will be of wide interest, and should find use in dairy and factory control, in milk recording and in educational circles.

The committee emphasizes in their foreword to the standard Babcock methods that successful results cannot be obtained by these methods if unreliable apparatus is used, and strongly recommend that apparatus approved by the National Physical Laboratory as conforming with the British Standard Specification should be used.

The two publications quoted above are obtainable from the Publications Department, Standards Association of Australia, Sydney, No. 755—Part 1 and No. 755—Part 2, price 4s. 3d. each net, plus postage.

*H. J. Green, Govt. Printer, Melbourne.*



## Seed Cleaning Machinery

Grain Cleaning Machinery
Oat Clipping and Grading Plants
Grinding and Mixing Plants
Bag Trucks. Bag Stackers, &c.

*Write for Catalogues*

**ROBERT BODINGTON PTY. LTD.**
Queensberry and Leicester Streets, Carlton, Melbourne, Vic.
Established over 80 years

*YOU GET THE BEST BY USING THE BEST*

# COCKBILL'S

BLOOD & BONE
BLOOD, BONE, & SUPER.
MEAT MEAL
BONE MEAL
BONE GRIT
NEATSFOOT OIL

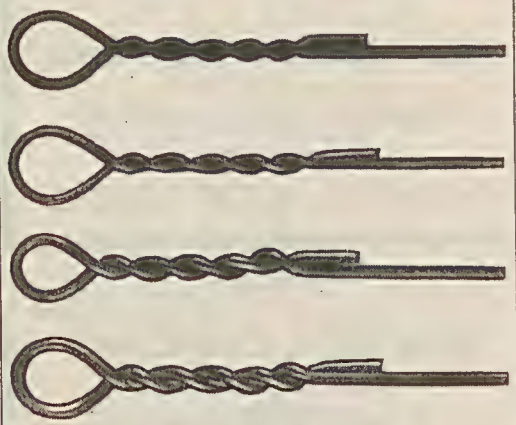
## J. COCKBILL

407 POST OFFICE PLACE, MELBOURNE, C.1
TELEPHONES—CENTRAL 2097, 2098

GERRARD
The Tie That Binds

# BALE TIES

*for Bales of Fodder, &c., with Properly looped ends*



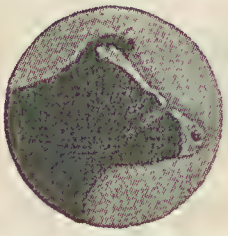
**Made in Black and Galvanized Wire in any required gauge straightened and cut to length**

SAVE TIME
*and* MONEY

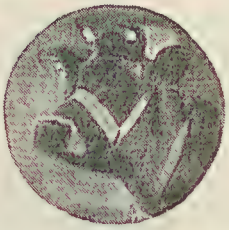
*Manufactured and Distributed by*

**GERRARD WIRE TYING MACHINES Co. Pty. Ltd.**

18-24 Ireland Street, West Melbourne, C.3
269-271 Sussex Street, Sydney
Makerston Street, Brisbane
Molton Street, Adelaide



# Stud Breeders' CARDS



*Leading Red Polls*

## "GIPPS" RED POLLS

The well-established herd of Red Poll Cattle at Warragul High School.

**Young Bulls, Heifers, and Tested Females for Sale.**

INSPECTION CORDIALLY INVITED.

*Inquiries to the Head Master,*

**WARRAGUL HIGH SCHOOL**

*Leading Friesians*

## THE VICTORIA FRIESIANS

The Friesian Herd conducted by the Department of Agriculture at the Werribee Research Farm includes some of the most consistent producers in Victoria.

*Males and Females For Sale.* *Inspection cordially invited.*

**DEPARTMENT OF AGRICULTURE**
MELBOURNE

*Poultry*

## WHITE LEGHORN
DAY-OLD CHICKS
**£4 per 100 (unsexed)**

Book early, 25 % deposit with order, balance before delivery

## A. T. DENT,
"Ridgeway," Edward St., GREENSBOROUGH, VICTORIA
Holder of Burnley Certificates
**SETTINGS - - 10s. 6d.**

*Advertising Rates*

## STUD BREEDERS' CARDS

Advertisements for this section accepted at following rates :—

7 to 12 insertions - **15/-** per insertion
2 to 6 insertions - **17/6** per insertion
One insertion only, **£1**

For further particulars write to
**Director, Department of Agriculture**
MELBOURNE, C.2

INCORPORATING in an improved manner all that has appeared in the "Poultry Bulletin," now out of print, together with articles that have appeared in the *Journal of Agriculture*, "Poultry Farming" deals with every aspect of the industry, from the establishment of the farm to the marketing of eggs and of birds.

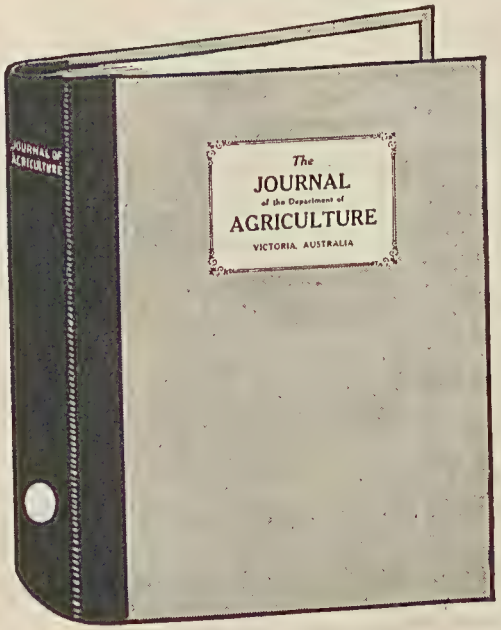
*Obtainable from*

**The Director, Department of Agriculture, Melb. C.2**

DEPARTMENT OF AGRICULTURE

# KEEP YOUR JOURNALS TOGETHER

A handsome gold-embossed Cover in which monthly copies of the Journal of Agriculture are easily bound may be obtained from the Department of Agriculture




Made to hold 12 monthly copies and the annual index, this Cover will keep your Journals clean and in proper sequence and ensure you easy and immediate access whenever reference is necessary

**Price 1s. 6d.** Post Free

**Obtainable from the Director, Department of Agriculture, Melb., C.2**

# LYSAGHT'S

**100% Australian Made 100%**

## Fencing and Other Wires, Wire Netting, Zinc Oxide.

Our Netting and Other Products are known through the Commonwealth as of the highest standard. Obtainable from all leading Merchants and Storekeepers.

LYSAGHTS AUSTRALIAN MADE WIRE NETTING PROOF SYDNEY N.S.W. REG. TRADE MARK

**Look for Our Marker in Every Roll of Netting.**

*Manufactured by*

**Lysaght Bros. & Co. Pty. Ltd.**

*Head Office:* 17-19 Bridge Street, Sydney
*Works:* Parramatta River

*Agents for Victoria:* Gibbs, Bright & Co., 34 Queen Street, Melbourne

### Nursery Stock

Fruit trees, strong, 1/6 each; usual size, 1/- each, 10/- per dozen, 75/- per 100. Citrus, balled, 3/6 to 6/- each. Grape Vines, Rhubarb, 6/- doz. Strawberry, 2/6 100. Raspberry, 1/- doz., 6/- 100. Currants, Gooseberry, Logans., 4/- doz., 25/- 100. Choice Roses, 1/- each, 10/- doz. Wattles, Sugar, Mahogany Gums, Cypress, 6/- doz., 45/- 100. Oak, Maples, Elms, Ash, Birch, 1/6 to 4/- each

**A. G. NIGHTINGALE & Co., Nurseries,**
EMERALD, VIC.

### Red Polls

**THE VICTORIA RED POLLS**
The largest Registered Herd-tested Red Poll Stud in the Commonwealth.

**BULL CALVES FOR SALE**

*The progeny of Tuberculin-tested stock and of cows tested in the Standard Herd Test. All are eligible for registration in the Red Poll Herd Book of Australia.*

INSPECTION CORDIALLY INVITED

*For further particulars apply to*
THE DIRECTOR OF AGRICULTURE, MELBOURNE, C.2,
OR THE MANAGER, STATE RESEARCH FARM, WERRIBEE

# *Send Your Goods by Rail!*

Specially Fast Goods Trains are scheduled for the carriage of produce from country stations for the early morning markets in Melbourne . . .

*Services from Melbourne to the majority of stations throughout Victoria provide for—*

**GOODS BEING RECEIVED FOR DESPATCH UP TO 4.30 P.M. AND DELIVERED AT DESTINATION STATIONS EARLY THE NEXT MORNING . . .**

**Also Fast Inter-State Goods Train Services.**

For Details of { FREIGHT RATES—Telephone MY210 (Extension 1243)
TRAIN SERVICES— „ „ ( „ 1193)
or consult your local Stationmaster.

**THE VICTORIAN RAILWAYS**
**For FAST, SAFE, and DEPENDABLE SERVICE!**

# This Journal

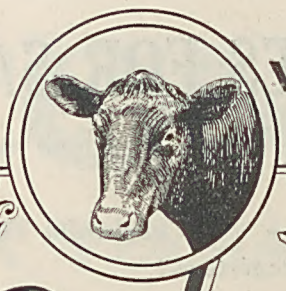
**offers exceptional advantages**

# for Advertising

Circulates throughout the **Country Districts** of **Victoria** and amongst **Farmers** of the **Commonwealth**, reaching also country professional men, tradesmen, schoolmasters, teachers, and the like.

Exceptionally satisfactory results have followed the advertising of Stud Stock in this Journal.

*Rates on application to the Official Canvasser*
DEPARTMENT OF AGRICULTURE, MELBOURNE, C.2



THE VICTORIA HERD

of Red Poll Cattle

Maintained for Milk and Beef at the State Research Farm, Werribee.

R.M.S.

# BULL CALVES

## Six For Sale

No. 1. VICTORIA HIS HIGHNESS. (AA, C.R.) Born 13th October, 1935 *Price* 25 guineas f.o.r. Werribee
*Sire:* Chandpara Valentine (762 AA). *Dam:* Victoria Majesty (2090 AA).
Victoria Majesty has produced 311 lb. butter-fat in 273 days.

No. 2. VICTORIA PONTIFF. (AA, C.R.) Born 14th January, 1937 .. *Price* 25 guineas f.o.r. Werribee
*Sire:* Chandpara Valentine (762 AA). *Dam:* Victoria Rosary (2759 AA).
Victoria Rosary produced 299 lb. butter-fat in 273 days as Jr. 4.

No. 3. VICTORIA PHILIP. (A, C.R.) Born 19th June, 1937 .. *Price* 17 guineas f.o.r. Werribee.
*Sire:* Victoria Donald (Vol. 9). *Dam:* Victoria Philopena (Vol. 9)
Victoria Philopena has produced 317 lb. butter-fat as a Jr. 2 in 273 days.

No. 4. VICTORIA ARMOUR. (A, C.R.) Born 15th December, 1937 *Price* 13 guineas f.o.r. Werribee
*Sire:* Chandpara Valentine (762 AA). *Dam:* Victoria Amaranth (3006 A).
Victoria Amaranth has produced 354 lb. butter-fat in 273 days.

No. 5. VICTORIA HERON. (A, C.R.) Born 20th April, 1938 .. *Price* 11 guineas f.o.r. Werribee
*Sire:* Chandpara Valentine (762 AA). *Dam:* Victoria Avrette (3893 A).
Victoria Avrette produced 349 lb. butter-fat in 273 days

No. 6. VICTORIA MARTYR. (A, C.R.) Born 14th June, 1938 .. *Price* 11 guineas f.o.r. Werribee
*Sire:* Woodburn Peter Pan (1504 AA) (Imp. in utero). *Dam:* Victoria Amarylis (3007A).
Victoria Amarylis has produced 381 lb. butter-fat in 273 days.

*Prices are based on the average butter-fat production of the dam in 273 days, except in the case of progeny of heifers without completed test, the price then being 10 guineas.*

*An amount of 2 guineas per quarter maintenance has been added to calves 3 months old and over.*

Inspection cordially invited. For further particulars apply to—

THE DIRECTOR OF AGRICULTURE, MELBOURNE, C.2: OR THE MANAGER, STATE RESEARCH FARM, WERRIBEE

# FRIESIAN BULL CALVES FOR SALE

## The Victoria Stud, State Research Farm, Werribee

***Herd Tested - Tuberculin Tested Registered***

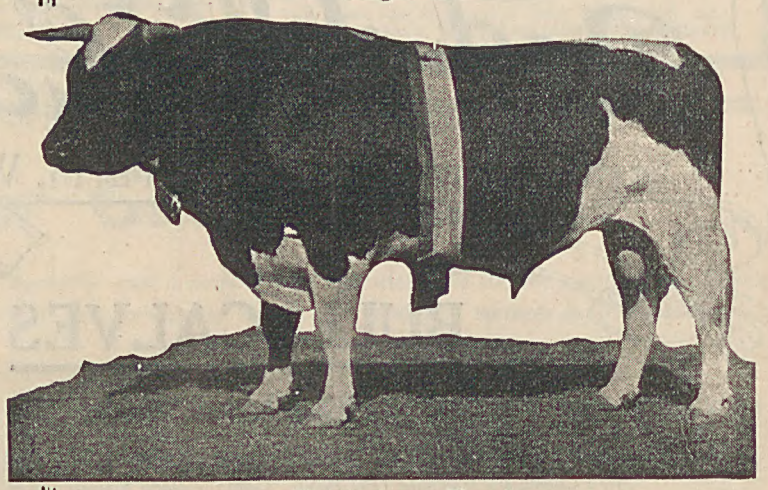
*Sons or grandsons of the*

**Former Herd Sire**

**VICTORIA JOYOUS MERCEDES (985):**

**Champion, Melbourne Royal Show 1931 and 1933**

**Reserve Champion 1928, 1929, and 1934.**



*Victoria Joyous Mercedes*

*Dam:*

Victoria Joybell, produced 15,387 lb. milk, 3·67 % test, 565 lb. butter-fat in 273 days, twice-a-day milking.

*Daughters:*

His eight (8) first-calf daughters have averaged 9,930 lb. milk, 3·73 % test, 370 lb. butter-fat in 273 days on first lactations.

**INSPECTION -- INVITED --**

**1. VICTORIA MARQUIS** (C.R.) *Born 22nd November, 1937*

*Sire:* Rupertswood Inka Jo (1732) *Dam:* Victoria Joyous Piebe (3259)
Victoria Joyous Piebe has produced 546 lb. butter-fat in 273 days.

*Price:* **21 guineas** f.o.r. Werribee

**2. VICTORIA BARITONE** (C.R.) *Born 2nd December, 1937*

*Sire:* Rupertswood Inka Jo (1732) *Dam:* Victoria Joyous Song (Vol. 14)
Victoria Joyous Song is on her first lactation. Her dam produced 527 lb. butter-fat in 273 days.

*Price:* **10 guineas** f.o.r. Werribee

**3. VICTORIA CORAL** (C.R.) *Born 5th February, 1938*

*Sire:* Rupertswood Inka Jo (1732) *Dam:* Victoria Choree (5105)
Victoria Choree produced 357 lb. butter-fat in 273 days as Sr. 3.

*Price:* **11 guineas** f.o.r. Werribee

**4. VICTORIA EMPEROR** (C.R.) *Born 11th March, 1938*

*Sire:* Victoria Mikado (New Vol.) *Dam:* Victoria Woodcrest Daisy (5112)
Victoria Woodcrest Daisy has produced 425 lb. butter-fat in 273 days as Jr. 4.

*Price:* **13 guineas** f.o.r. Werribee

*For further particulars apply to*

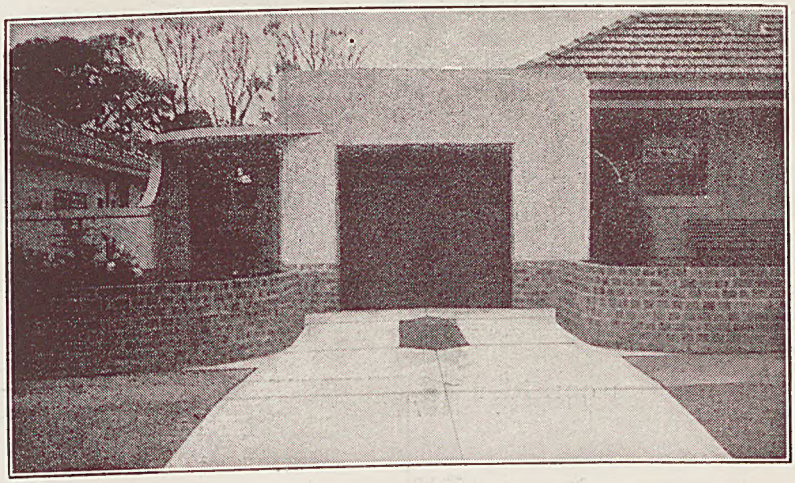
**The Director of Agriculture, Melbourne,**

***or The Manager, State Research Farm, Werribee.***

H. J. GREEN, Government Printer, Melbourne.

# CONCRETE

## FOR PERMANENT SATISFACTION



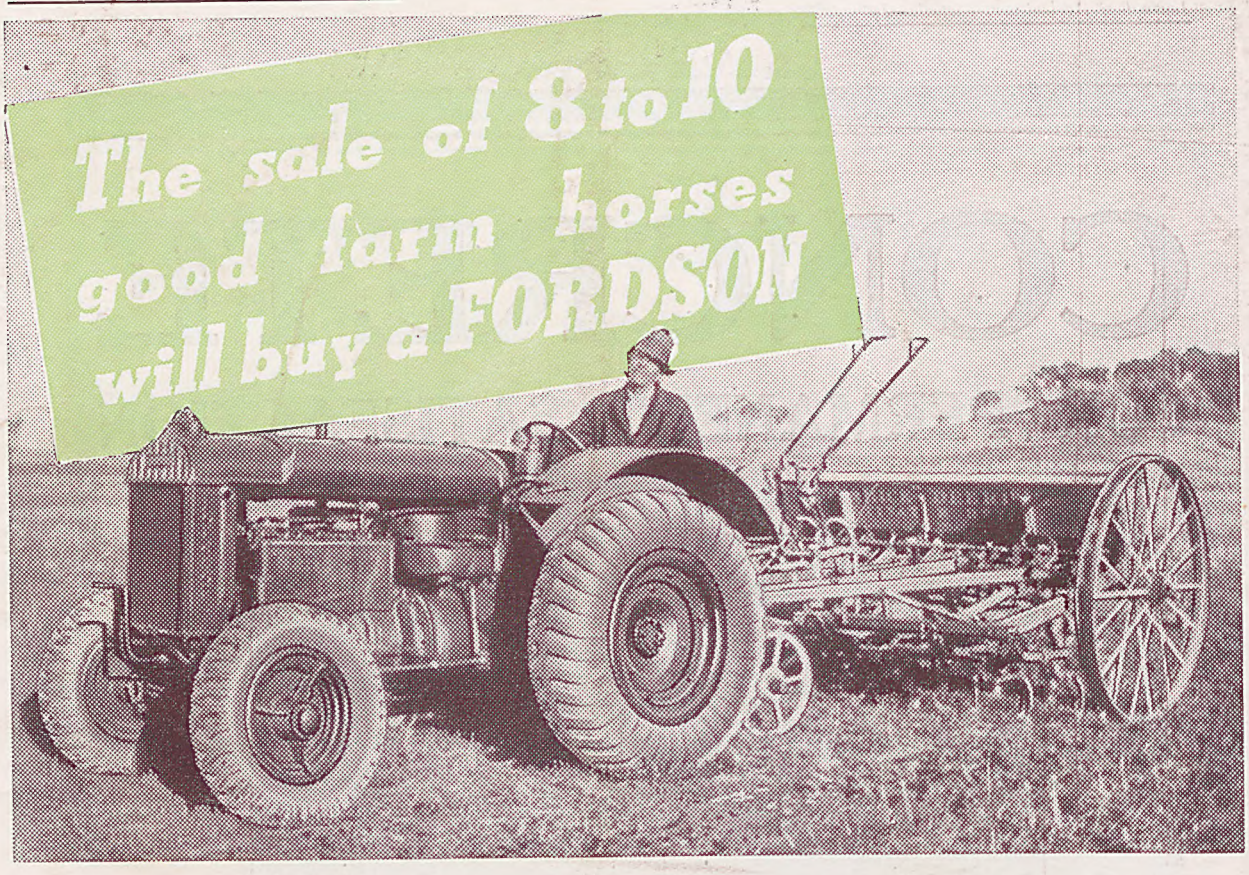
## "ARC" Brand GEELONG Cement

Booklets on the Uses of Concrete around the Farm and Home can be obtained without obligation and will be mailed free on request.

**AUSTRALIAN CEMENT LIMITED**

TEMPLE COURT, 422 COLLINS ST., MELBOURNE, C.1

*Telephone :* M 1771 (4 lines)




SOME tractor users consider cheap fuel the main factor in operating costs. Fordson costs far less to buy than tractors using low-grade fuels. This saving in purchase price alone will pay for sufficient power Kerosene to enable your Fordson to plough up to 6,000 acres of wheat land. It will pay you to test Fordson. Get in touch with your local Fordson dealer and arrange for a demonstration on your own property. The Fordson finance plan provides exceptionally easy purchase terms.

**PRICES FROM £242**

*Plus Delivery Charges*

**FORDSON FEATURES**

HEAVY-DUTY TRANSMISSION
"HOT-SPOT" FUEL VAPORISER
GOVERNOR CONTROL
OPTIONAL SPEEDS
OPTIONAL GEAR RATIOS
STATICALLY AND DYNAMICALLY BALANCED CRANKSHAFT
EXHAUST VALVE INSERTS
BOSCH MAGNETO IMPULSE STARTER
REAR END POWER TAKE-OFF (optional at extra cost)

The English **Fordson** TRACTOR

SP 630-5 V645

*Distributors:* MALCOLM MOORE LTD., City Showrooms: 601-603 Little Collins St., Melb., VIC.

FORD MOTOR COMPANY OF AUSTRALIA PTY. LTD. (INCORPORATED IN VICTORIA) F278.27T